"MANAGEMENT OF POSTERIOR CAPSULAR TEAR WITH SCLERAL FIXATION LENSES" A PROSPECTIVE STUDY

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The Ethics Committee, Coimbatore Medical College has decided to inform that your Dissertation is accepted / ~~Not accepted~~ and you are permitted / ~~Not Permitted~~ to proceed with the above Study.

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CERTIFICATE

This is to certify that this dissertation entitled "**MANAGEMENT OF POSTERIOR CAPSULAR TEAR WITH SCLERAL FIXATION LENSES"** has been done by **Dr. M. KANNAN,** under my guidance in Department of OPHTHALMOLOGY, Coimbatore Medical College Hospital, Coimbatore.

I certify regarding the authenticity of the work done to prepare this dissertation.

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DECLARATION

I, **Dr. M.KANNAN,** solemnly declare that the dissertation titled "**MANAGEMENT OF POSTERIOR CAPSULAR TEAR WITH SCLERAL FIXATION LENSES"** has been prepared by me.

This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment of the requirement for the award of M.S., (Ophthalmology) Branch – III Degree Examination to be held in March 2010.

Place : Coimbatore
Date :

Dr. M. KANNAN

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DR.M.KANNAN

"MANAGEMENT OF POSTERIOR CAPSULAR TEAR WITH SCLERAL FIXATION LENSES"
A PROSPECTIVE STUDY

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Part one:

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“MANAGEMENT OF POSTERIOR CAPSULAR TEAR WITH SCLERAL FIXATION LENSES "

1. INTRODUCTION

Aphakia was once considered a complication of cataract surgery. The crystalline lens is responsible for approximately 30 percent of the total ocular dioptric power; removal of the lens therefore results in marked visual disability. The goal of effective rehabilitation after cataract extraction is a timely return to maximal visual function, including clear central and peripheral vision, stereopsis when possible, and comfort.[1]

The development of safe, effective IOLs to eliminate the optical problem of aphakia is one of the great successes of modern ophthalmology. Whereas early lens designs and fixation sites were associated with an unacceptably high rate of complications, [2, 3.] modern posterior chamber IOLs have a track record of remarkable safety and provide excellent visual outcome after insertion into the capsular bag or sulcus after uncomplicated cataract surgery. In the presence of a posterior capsule tear during cataract extraction, the intraocular lens (IOL) can be placed in the sulcus if the capsular rim is available or in the bag if the tear is small.

When the posterior capsule tear is large or the capsular rim is unstable, scleral fixated intraocular lenses (SFIOL) or anterior chamber intraocular lenses (ACIOL) can be implanted. There are certain advantages of SFIOL over ACIOL

such as less corneal endothelial damage, minimising aniseikonia in contralateral eyes that are phakic or pseudophakic with a posterior chamber IOL in place.[4-7] Theoretical advantage of their use relate to a perceived better safety profile over anterior chamber intraocular lenses (AC-IOL) in regard to complications such as corneal endothelial compromise, peripheral anterior synechia and glaucoma. These issues are particularly relevant as the population group on whom this type of surgery is undertaken are often young (for example, ectopia lentis in Marfan syndrome) or have a history of prior ocular trauma, and consequently sutured PC-IOLs are considered by many the procedure of choice in these patients.[8]

2. REVIEW OF LITERATURE

Secondary intraocular lens implantation as defined by Azar is insertion of an IOL into an eye which has been rendered aphakic by prior cataract extraction by any method, or by an exchange of IOL, which is a special case of secondary IOL implantation.

TYPES OF SECONDARY IMPLANTS

Secondary implants are of following types:-

1. Secondary PCIOL, where PC is intact totally or partially following planned ECCE.

2. Secondary ACIOL, after planned ICCE irrespective of vitreous face in patients above the age of 50.

3. Scleral fixation IOL where ACIOL can't be implanted or deferred to avoid corneal endothelial damage.

INDICATIONS FOR SECONDARY IOL IMPLANTATION

l. Monocular aphakia

a) Spectacle or contact lens intolerance.

b) Old disabled patients with tremor, Parkinsonism and other physical disability which makes handling and using of spectacle or contact lens difficult.

c) Occupational and circumstantial situations where spectacle or contact lens is not suitable, like athletes, dancers, etc…

2. Contralateral pseudophakia

a) Aborted primary IOL implantation

b) Bilateral aphakia as in children..

c) Corneal decompensation due to ACIOL.

d) In combination with other procedures, such as pars plana lensectomy for the treatment of a dislocated crystalline lens, penetrating keratoplasty, or trabeculectomy.

Secondary IOL implantation surgery should preferably be performed 4-6 weeks after the initial surgery.

3. SCLERAL FIXATION IOLs

Gess[9] first described scleral fixation of one haptic of a posterior chamber lens. In 1986, **Malbran and colleagues**[10] described an open-sky technique for sutured PC IOLs, and in 1988, **Cowden and Hu**[11] reported secondary PC lens implantation with scleral fixation of both haptics through scleral stab incisions.

ADVANTAGES OF TRANSSCLERALLY SUTURED IOL FIXATION INCLUDE

The elimination of corneal and angle trauma associated with anterior chamber lenses.

1) Decreased risk of pupillary block and secondary glaucoma

2) Little or no IOL contact with the iris, thereby decreasing the risk of iritis, pigment dispersion, and CME.[12]

3) The sulcus location most closely approximates the normal anatomic position of the crystalline lens, and this method of PC IOL fixation minimizes the risk of pseudophakodonesis.[13]

4) In addition, transsclerally sulcus–sutured posterior chamber IOLs theoretically can be used in any age group, including children,[14-16] because the lenses are more likely than anterior chamber lenses to accommodate to the growing eye.

DRAWBACKS TO TRANSSCLERALLY SUTURED IOL FIXATION INCLUDE

1) Compared with AC IOL insertion and iris-sutured PC IOLs, the procedure is technically more difficult, requiring longer surgical time and a thorough anterior vitrectomy, both of which might increase the risk of intraoperative and postoperative complications.

2) It is difficult to precisely and symmetrically fixate both haptics within the ciliary sulcus.[17-19] The anatomy of this space, which averages 11.0 ± 0.37 mm in diameter[20] and is located approximately 0.83 mm and 0.46 mm posterior to the surgical limbus in the vertical and horizontal meridians,[21] respectively, may be altered in long-standing aphakia.[18]

In **Pavlin's** ultrasound biomicroscopy study of 34 transsclerally fixated PC IOLs, 13 IOLs were in the ciliary sulcus, 8 were posterior, and 13 were anterior.[17]

Manabe also used the ultrasound biomicroscope to identify haptic placement and found only 32 of 86 haptics sutured at the sulcus; there were 29 at the ciliary processes, 25 posterior to the pars plicata, and 41 with vitreous incarceration.[19]

Additionally, in a clinical study comparing complications of AC IOL versus transsclerally fixated PC IOL implantation, **Bellucci** showed that six of 32 PC IOLs were in the sulcus, 24 were in the pars plana, and 2 were in the iris root.[18]

TECHNIQUES OF SUTURE PASSES

Numerous variations for making the suture passes also have been explored. These include either an **ab externo** or **ab interno** approach, single or dual passes, and direct passage or capture with a 25- to 27-gauge hollow needle. Different IOL designs (*i.e.*, with or without eyelets, one-piece or foldable) and suture needles (*i.e.*, long or short, straight or curved) xist for different techniques.

THE AB EXTERNO APPROACH

The **ab externo** approach uses an outside to inside suture pass that allows more precise needle placement and reduces the duration of hypotony. [22]

TECHNIQUE FOR THE AB EXTERNO APPROACH

1) The long, straight solid needle is passed through the sclera (usually under partial-thickness scleral flaps) approximately 0.75 mm posterior to the limbus. Inside the eye, the needle should exit at the ciliary sulcus. A second hollow needle is passed from the opposite side of the eye. A pair of sutures can be used if four-point fixation is desired. (Fig.1)

2) Solid needle is “docked” inside the tip of the hollow needle, which has been passed through ciliary sulcus on the opposite side. After docking, the pair of needles are withdrawn together from the eye, with the solid needle inside the hollow needle. (Fig. 2)

3) A hook is used to pull the suture out through a superior limbal wound so that it can be tied to the intraocular lens (IOL). (Fig. 3)

4) Suture is cut, and each end is tied to a haptic of the IOL. After the IOL is placed into position, the scleral sutures must be anchored to the sclera. Either a "blind pass" in the sclera is made so that the suture is tied to itself, or the transscleral suture is tied to a second suture that has been tied to the sclera with a short partial-thickness pass within the bed of the scleral flap. (Fig. 4) [23]

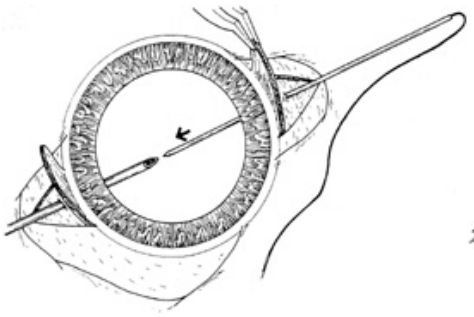
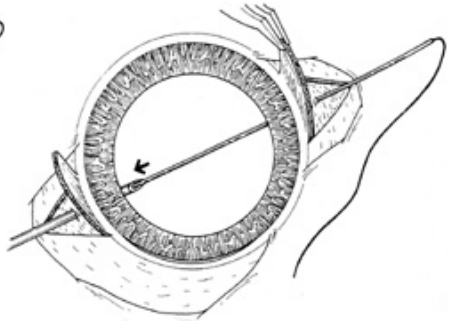


FIGURE 1



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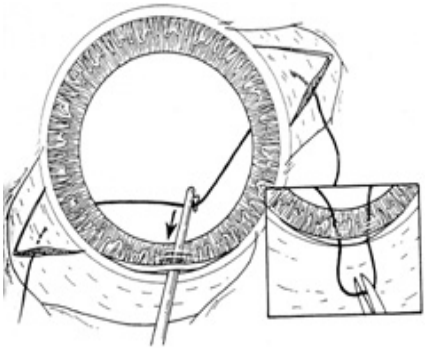

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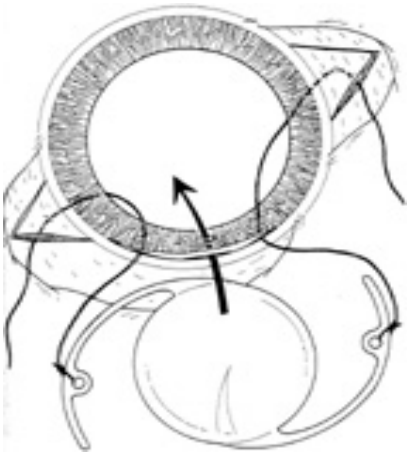


FIGURE 4

THE AB INTERNO APPROACH

Ab interno techniques are performed by passing the suture needle from the inside to the outside of the eye, and have the advantage of being faster.

TECHNIQUE FOR THE AB INTERNO APPROACH

1) First the long needles are passed under the iris, aiming for the inferior ciliary sulcus. Two needle passes are made for each haptic if four-point fixation is desired. Needles exit under previously dissected scleral flaps. (Fig. 5)

2) A second pair of short needle passes is made under the superior iris for the suture to be tied to the second haptic.(Fig.6)

3) Girth hitch can be used to attach the polypropylene suture loop to the intraocular lens (IOL) haptic. This technique is more rapid than tying the suture to the haptic. Alternately, the suture can be attached to the IOL haptics before the transscleral needle passes, but the surgeon must avoid tangling the long sutures. (Fig. 7)

4) After exiting the eye under the previously dissected scleral flaps, the sutures are tied securing the IOL into position. Appropriate suture tension is important to avoid lens decentration. The inset shows the cross-sectional view of the eye with the IOL correctly positioned in the ciliary sulcus. (Fig. 8) [24]

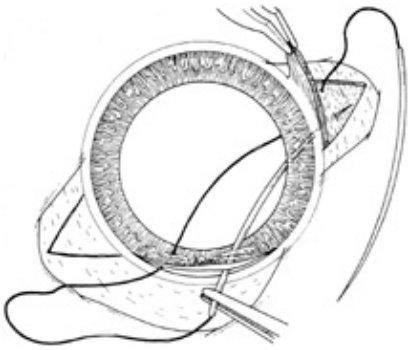


FIGURE 5

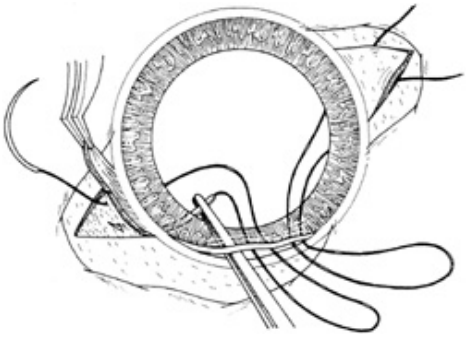


FIGURE 6

FIGURE 7

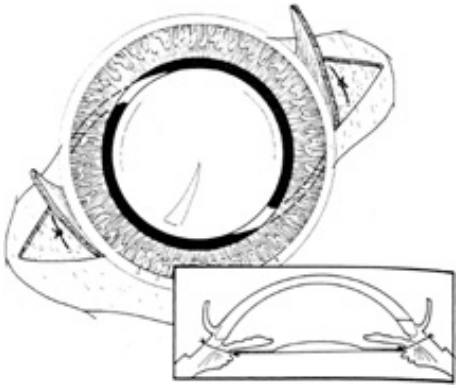


FIGURE 8

SURGICAL TECHNIQUES OF SCLERAL FIXATION IOLs

LEWIS TECHNIQUE

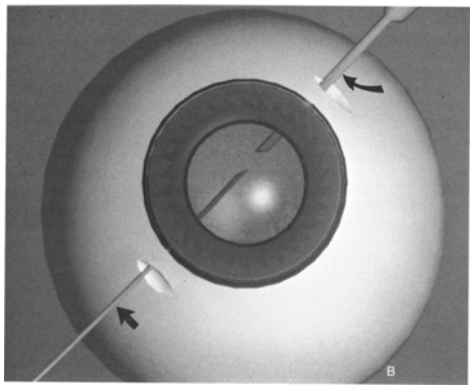
1) A 7 mm limbal incision is made, anterior vitrectomy done and 2 limbal based conjunctival flaps are prepared at 2 and 8'o clock position.

2) A 28-gauge hollow bore needle is passed through 2'o clock flap into posterior chamber and a straight needle with 10-0 polyprolene suture passed through 8'o clock flap is advanced into the hollow bore needle as far as possible (**rail-road technique, Fig. 9)** and the needle with the suture is withdrawn through 2'o clock flap. (Fig. 10)

3) The straight needle is re-entered through 2'o clock flap 1.5 to 2 mm from the first suture's exit and is exited through 8'o clock flap by rail-road technique again. (Fig. 11)

4) Both the sutures in posterior chamber are retrieved with a hook through 7 mm incision(Fig 12) , loops cut, separated and one suture from each pair is threaded into the islet of the haptic and threads of each pair tied together using 3-1-1 square knot. Each knot is rotated till it exits the eye.

5) IOL is inserted (Fig. 13) and positioned in the ciliary sulcus and rotated by pulling on the sutures (Fig. 14). Sutures are cut, tied using 3-1-1 square knot, rotated again and knot buried in the flap (Fig. 15).



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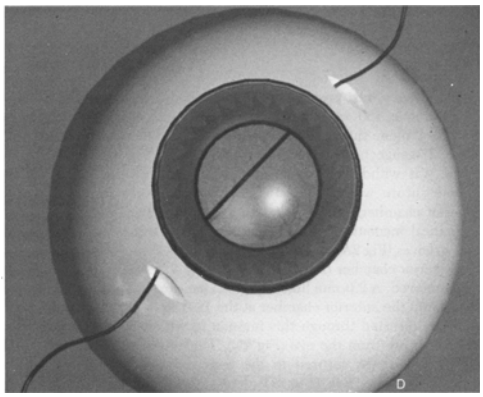

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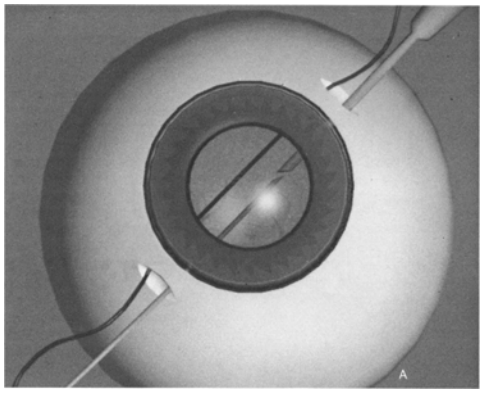

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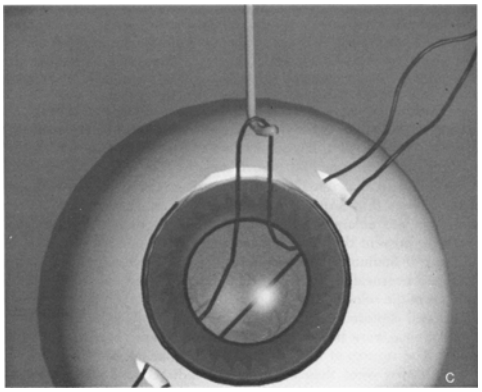

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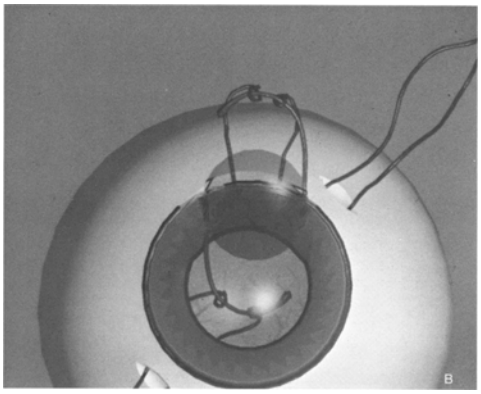

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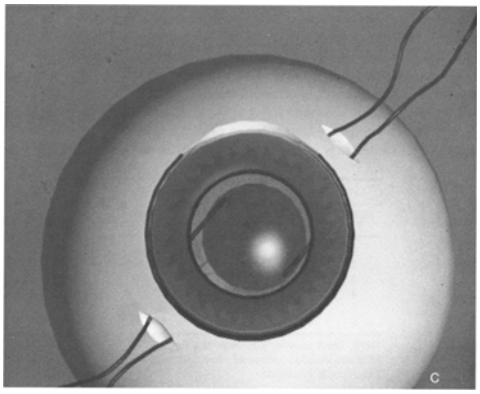


FIGURE 14

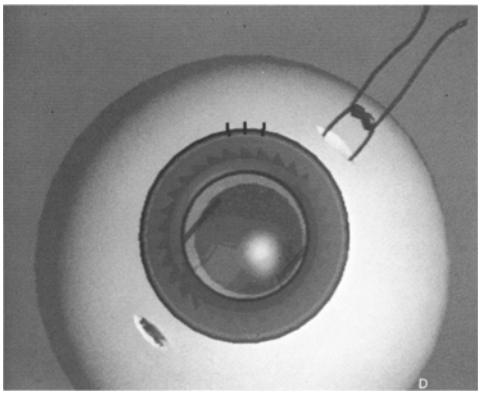


FIGURE 15

LANE'S TECHNIQUE [25]

1) After an anterior vitrectomy, a 7 mm scleral tunnel is made at the limbus and one end of a double-armed 10-0 polypropylene suture (Ethicon CTC-6L) is passed through the distal eyelet of the intraocular lens. The needle is walked under the iris, into the ciliary sulcus, and exits through the previously exposed scleral bed. (Fig. 16)[26]

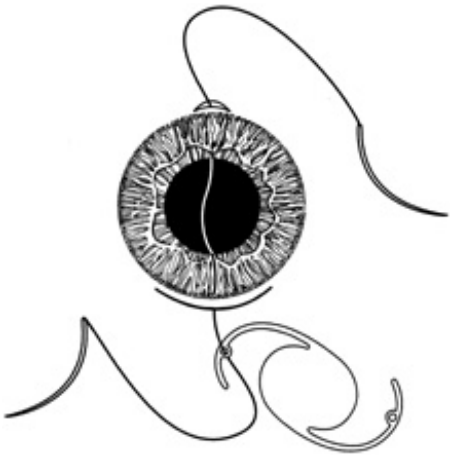
2) The second arm of this suture is passed in an identical manner so that it exits about 2 mm lateral to the first needle pass. (Fig. 17)

3) The needle of a single-armed CTC-6L suture is passed through a paracentesis located about 150 degrees away from the center of the wound, through the pupil, under the iris, and out through the posterior scleral lip of the wound 180 degrees away from the midpoint of the previous suture pass. (Fig. 18)

4) The free end of this suture is retrieved from the pupillary space and brought through the wound with a microhook. It is then securely tied to the eyelet in the proximal haptic of the lens, ensuring that it is not entangled with any of the previously placed distal sutures. Care is taken to loop the double-armed

suture symmetrically through the eyelets, thus minimizing torquing and tilting of the lens optic. (Fig. 19)

5) All sutures are gently pulled to remove excessive slack, and gentle traction on the distal sutures helps to guide the lens as insertion forceps are used to carefully place the leading haptic in the sulcus. The trailing or proximal haptic then is tucked under the iris with the assistance of tying forceps and a hook. The sutures then are secured. For the leading haptic, this is accomplished by cutting off the needles and tying the suture ends together, cutting the suture close to the knot, and burying the knot by rotating it into the sclera. The proximal suture, which is still attached to its needle, is pulled up, and a partial-thickness scleral bite is taken in the posterior bed of the incision. The suture is tied to itself and then trimmed. This knot is covered by sclera and thus effectively buried when the wound is closed in a watertight fashion with 10-0 nylon. (Fig. 20)



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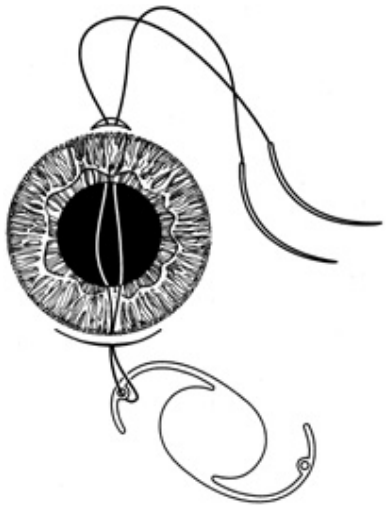

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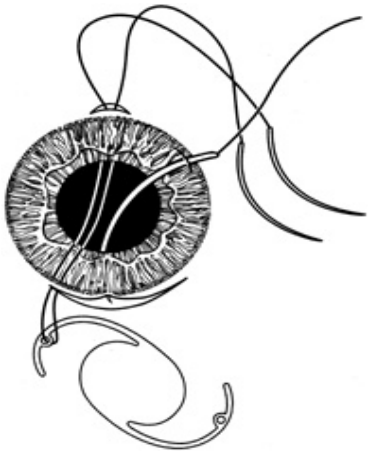

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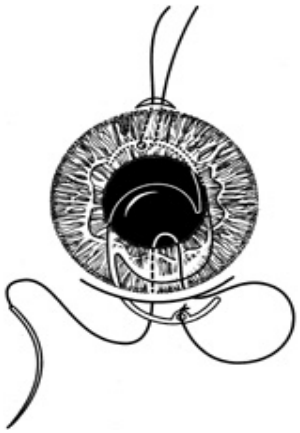

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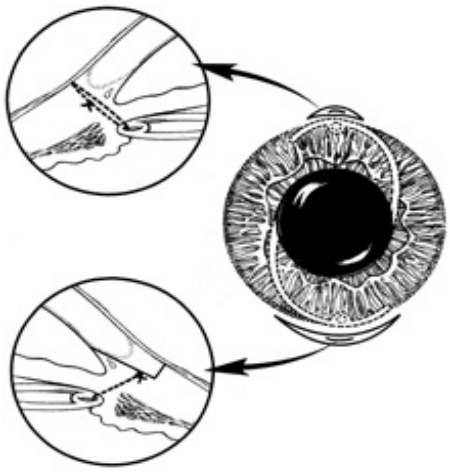


FIGURE 20

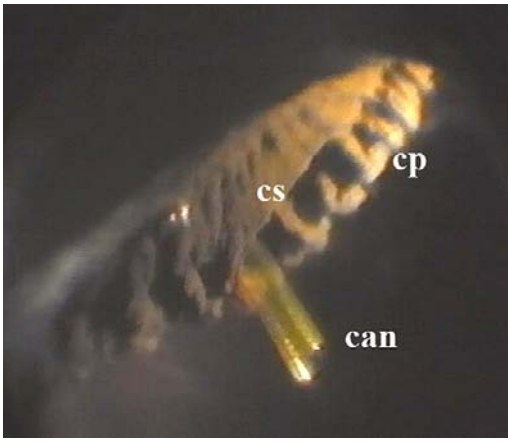
SUTURELESS INTRASCLERAL POSTERIOR CHAMBER INTRAOCULAR LENS FIXATION [27]

1) After a standard 3-port pars plana vitrectomy, a corneal incision is prepared for injector-assisted IOL implantation, 2 straight sclerotomies ab externo are prepared with a sharp 24-gauge cannula (Neopoint Luer #17) 1.5 to 2.0 mm from the limbus, 180 degrees from each other. The position of the ciliary sulcus sclerotomy is controlled by visualization with an indirect viewing system (EIBOS [Mo¨ller- Wedel GmbH] or BIOM [Oculus]) and deep scleral indentation. (Fig. 21)

2) The cannula is then used to create a limbus-parallel tunnel at about 50% scleral thickness, starting from the ciliary sulcus sclerotomies and ending with externalization of the cannula after 2.0 to 3.0 mm (Fig. 22)

3) A standard 3-piece IOL with a haptic design the same diameter as the ciliary sulcus is implanted with an injector, and the tailing haptic is fixated in the corneal incision. The leading haptic is then grasped at the tip with an end-gripping 25-gauge forceps (Janach J383825), pulled through the sclerotomy, and left externalized. (Fig. 23)

4) The forceps is introduced in the distal end of the limbus-parallel tunnel, grasps the externalized tip, and pulls the IOL haptic into the tunnel. After the trailing haptic is luxated intraocularly, the tip is grasped with the 25-gauge end-gripping forceps and pulled through the second sclerotomy. The tailing haptic is then introduced into the limbus-parallel tunnel and the IOL is positioned and centered. The distal ends of the loops are insidethe tunnel to prevent a foreign-body sensation and reduce the risk for inflammation. (Fig. 24)



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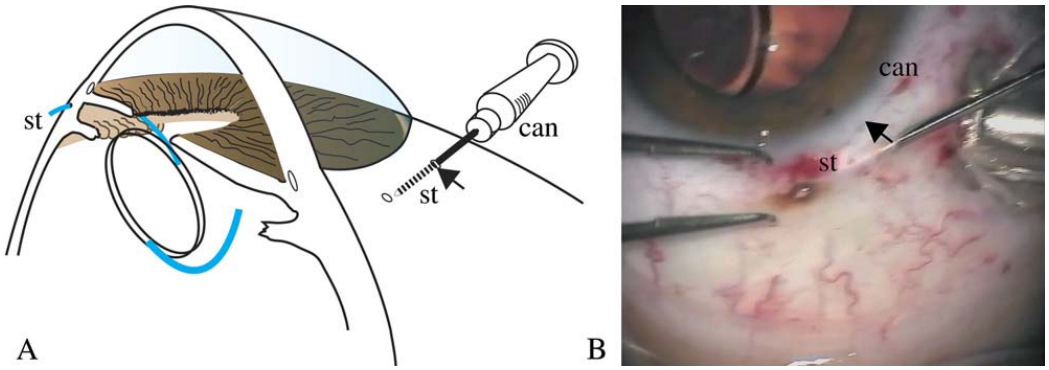

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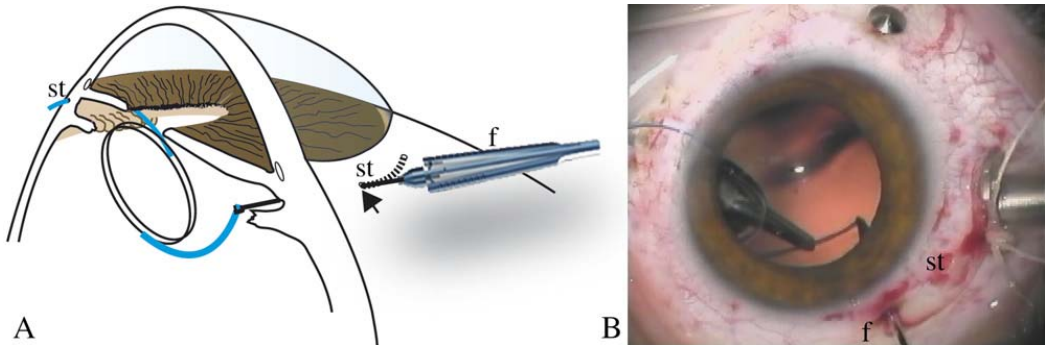


FIGURE 23

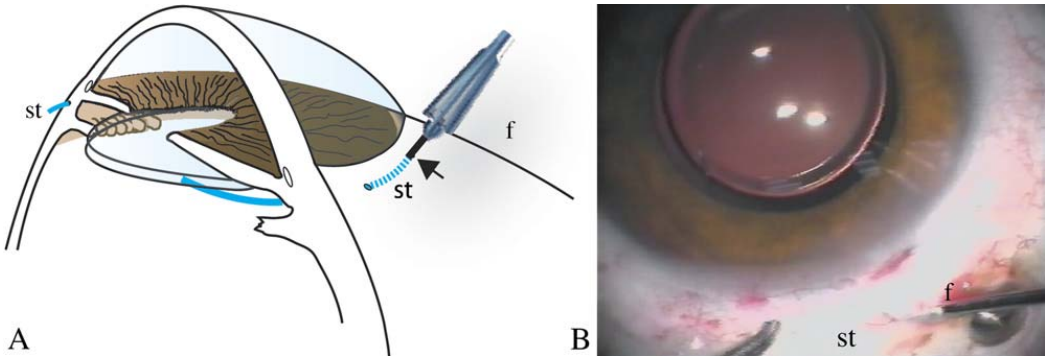


FIGURE 24

COMBINED SUTURE-IN-NEEDLE AND SCLERAL TUNNEL TECHNIQUE FOR SCLERAL FIXATION OF INTRAOCULAR LENS[28]

This technique involves insertion of a 10-0 polypropylene suture into the barrel of a 27-gauge sharp needle and creation of scleral tunnels to bury the knots for transscleral IOL fixation.

1) One end of a 10-0 polypropylene suture is inserted into a 27-gauge sharp needle (bottom left). The 27-gauge needle with the suture is passed through the roof of the scleral tunnel 1.0 mm posterior to the limbus. The loop of the suture, grabbed by a Sinskey hook, is pulled from the IOL implantation incision. (Fig. 25)

2) The 27-gauge needle is retracted while the suture end remains inserted in the cannula; it is then passed through the roof of the scleral tunnel 1.0 to 2.0 mm adjacent to the first pass of the needle. (Fig. 26,A) .The suture is grabbed by the Sinskey hook.(Fig. 26,B). The suture is pulled out of the IOL implantation incision to form a loop from the second fixation site. At this point, this is a free suture end and an extraocular loop from the implantation incision. (Fig. 26,C)

3) The free end at the implantation incision is passed through the eyelet and a knot is tied and put through the loop.(Fig. 27,A). The suture end at the second scleral fixation site is slowly and gently pulled.(Fig. 27,B). The fixation suture is passed through the entire sclera at the ciliary sulcus and forms an extraocular loop via the implantation incision.(Fig. 27,C)

4) Adouble loop is created at the tip of the extraocular loop by holding the suture with 1 forceps (lower) and pulling the tip of the loop back with another forceps (upper).(Fig. 28,A). The double-loop knot is set around the haptic and pulled to tighten. (Fig. 28, B)

5) Each suture end is retrieved through the scleral tunnel opening by passing a Sinskey hook into the scleral tunnel and pulling the suture end through the external excision. The suture ends are tied, and the knot is buried under the roof of the scleral tunnel. (Fig. 29)

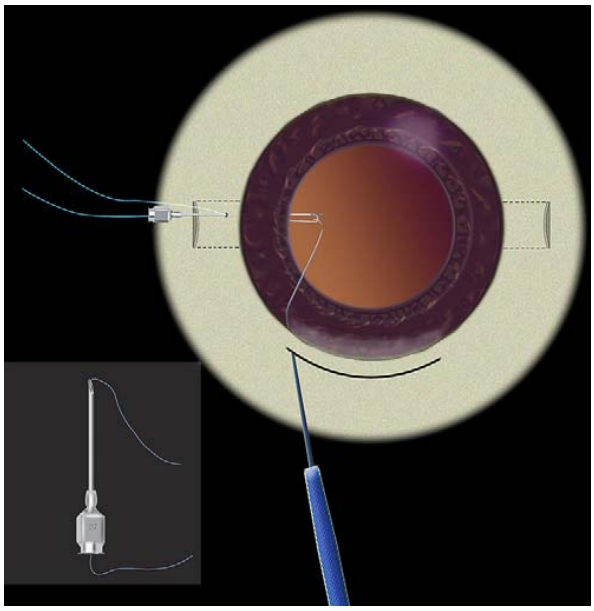


FIGURE 25

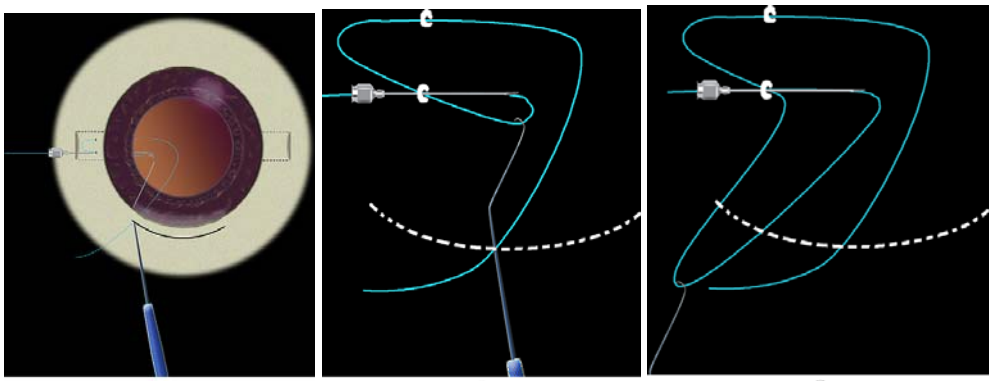


FIGURE 26 A B C

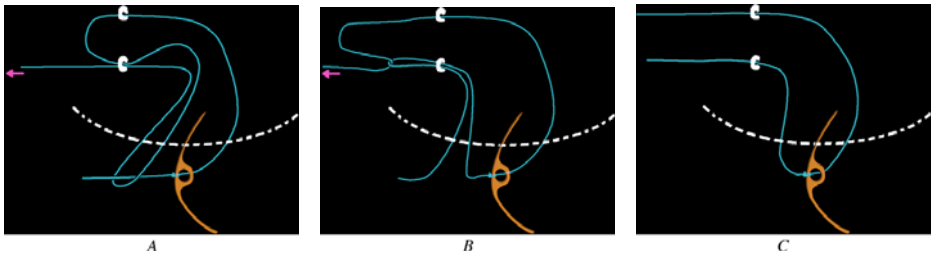


FIGURE 27 A B C

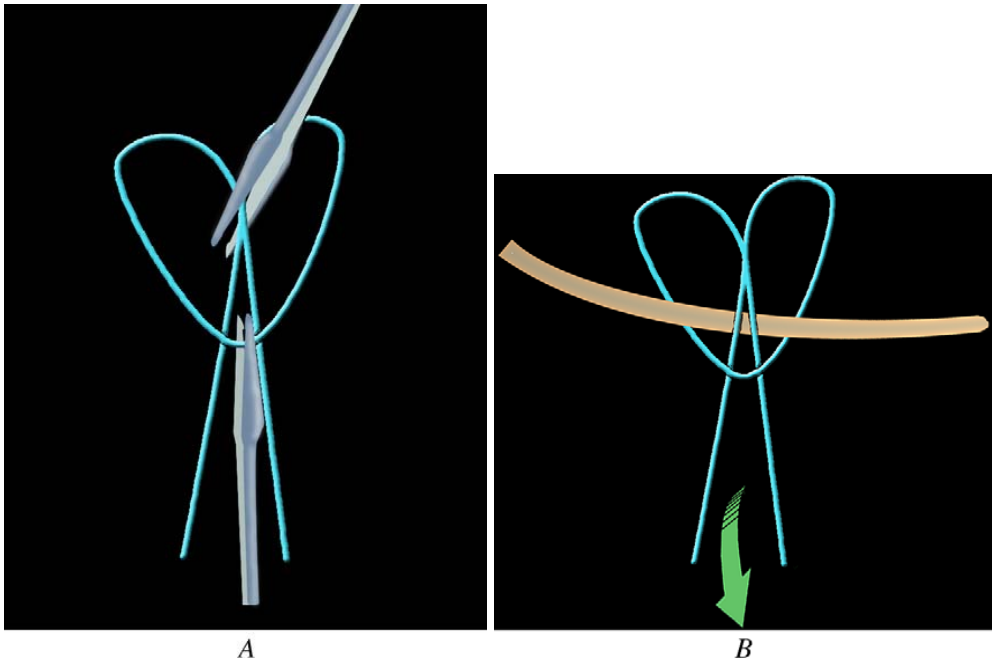


FIGURE 28 A B

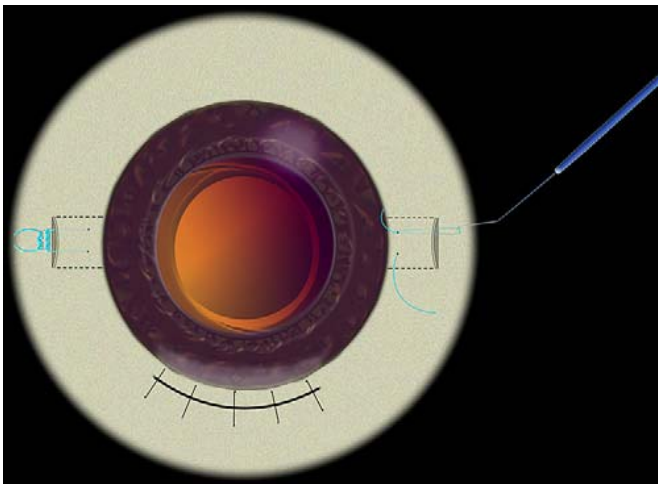


FIGURE 29

COMPLICATIONS OF SCLERAL FIXATION IOLs

Despite its anatomic advantage, trans-sclerally fixated IOL is associated with complications primarily because of haptic contact with uveal tissue and the need for haptic fibrosis to ensure long-term stability. Even without suture fixation, sulcus placement of a lens implant carries the risks of lens decentration , pigment dispersion, uveitis, recurrent hemorrhage , ciliary body erosion,[29-34] and, in one reported case, occlusion of the major arterial circle of the iris (located in the ciliary body), with devastating results.[35] Transscleral fixation introduces additional risks caused by needle penetration of uveal and scleral tissue, abnormal positioning of the haptics, and external suture exposure; these risks include lens tilt and decentration , lens subluxation, episcleritis, corneal decompensation, hypotony, PAS formation, secondary glaucoma, hyphema, vitreous hemorrhage, suprachoroidal hemorrhage, choroidal effusion, CME, RD, external suture erosion, and endophthalmitis.

SUTURE EROSION

Anand and Bowman[36] first described using scleral flaps to cover and protect the suture knots. However, Solomon[37] found a 73% rate of suture erosion through scleral flaps, suggesting that this approach delays but does not prevent this complication. **Friedberg**[38] created scleral grooves in which the knots were secured and then protected. Later, **Bucci and coworkers**[39] showed that covering the knot with corneal tissue prevents erosion. **Lewis**[40,41] subsequently reported methods for burying the suture knots in the sclera to avoid erosion through sclera and conjunctiva.

If suture erosion does occur, this problem can be treated in several ways, including cutting the free ends flush on the knot, cauterizing the knot, revising the scleral flap, or using a scleral patch graft.[54] A number of cases have been reported in which the sutures were removed, either to treat suture erosion or inadvertently. As a general rule, this is not recommended as lens decentration or dislocation can result, because there may be little or no fibrosis of the lens haptic to uveal tissue.[55]

POST-OPERATIVE GLAUCOMA, CORNEAL EDEMA

Lindstrom and Harris[42] found the incidence of various complications to be as great as 19.8% for CME, 10.8% for hyphema, 8% for secondary glaucoma, 5.4% for corneal edema, 3.3% for uveitis, and 1.6% for retinal detachment. In their personal experience with 153 cases, the incidences of the same sequelae were 4.6%, 0.7%, 3.9%, 2%, 2.6%, and 1.3%, respectively, with 81.6% of patients attaining visual acuity of 20/40 or better and 8.5% losing two or more lines of BSCVA. Depending on the study, as many as 94% of eyes achieved better than 20/40 vision, and the loss of more than two lines of BSCVA ranged from 3% to 10%.[42,43,44-46] However, these

reports antedated the availability of multiflex-style anterior chamber IOLs and sutured posterior chamber IOLs.

CYSTOID MACULAR EDEMA AND RETINAL DETACHMENT

The roles of vitreous loss and vitrectomy and their relationships to the development of CME and RD during the implantation of secondary AC IOLs is controversial. **Cozean**[46] suggested that there is a correlation between CME and disruption of the vitreous. **Shammas and Milkie**[47] also noted this relationship and stated that the incidence of CME increases if the secondary IOL implantation is performed within 1 year of intracapsular cataract extraction, the preoperative fluorescein angiogram is positive for CME, or there is vitreous loss. **Kraff and colleagues**[48] reported that vitrectomy may increase the risk of RD. **Wong and colleagues**[49] also suggested that vitrectomy might increase the chance of RD (their rate was 4%), but might lower the risk of CME, which they found to be 3%. Not surprisingly, this study also found a higher incidence of these problems in eyes with closed-loop anterior chamber as opposed to sulcus-placed posterior chamber lenses. Conversely, **Lyle and Jin**[50] reported similar incidences of CME (6%) when comparing eyes that received an AC IOL or PC IOL (68% had scleral suture fixation), but the rate of RD was higher in the latter group (0.8% for AC IOL versus 3.5% for PC IOL). Posterior vitreous detachment and vitreous liquefaction occurs in most aphakic eyes within 1 year postoperatively;[51] this may suggest an explanation for the decreased RD rate when secondary IOL insertion is performed after 1 year.[52,53]

Glaucoma and RD have been described in as many as 19% and 5.4% of eyes receiving sutured PC IOLs, respectively.[56] The reported incidence of new CME has ranged from 0%[54] to 18% in patients receiving a transsclerally sulcus-sutured PC IOL.[41]

HYPHEMA AND VITREOUS HAEMORRHAGE

Price and Wellemeyer found hyphema and/or vitreous hemorrhage in 13% of eyes, although **Bleckmann and Kaczmarek**[57] reported hyphema in 16.7% and vitreous hemorrhage in 25% of patients in their series. Other studies, however, state much lower incidences of intraocular bleeding, such as **Helal's group**,[58] which had a 4.9% rate of hyphema.

LENS TILT AND DECENTRATION

Lens tilt and decentration are potential complications that may occur in as many as 10% of cases with transsclerally sulcus–sutured PC IOLs[54.] Lens tilt occurs because of the torque created by asymmetric suture placement on the IOL. **Teichmann**[59] studied the combinations of suture configurations and found that only four were torque free. He recommended looping the sutures symmetrically through the opposing eyelets. Theoretically, tilt also can be eliminated with radial suture placement, but this is anatomically undesirable, because one of the sutures will exit through the ciliary body. In **Sharpe's** study of children,[60] an IOL tilt of 15 degrees in one case produced 6.5 D of cylinder. A decentered sutured PC IOL may result from a number of factors. These include asymmetric attachment of the sutures to the haptics; failure to place the needles through the sclera 180 degrees apart; and suture loosening, breakage, or slippage on the haptics. Therefore, to prevent lens malposition, it is important to use an IOL with eyelets on the haptics, symmetrically secure the sutures

to the eyelet, and place the needle passes an equal distance from the limbus and exactly 180 degrees apart. Fortunately, small degrees of lens tilt (less than 10 degrees) and decentration (less than 2 mm) are asymptomatic and clinically insignificant.[61,57]

To summarise, the complications of scleral fixation IOLs are :

Intra-operative complications

Intraoperative AC hemorrhage

Early complications (within 1 month)

1. Fibrin
2. Increase IOP>30 mm Hg
3. Corneal oedema
4. Hyphaema
5. Vitreous haemorrhage

Late complications (after 1 month)

1. Glaucoma
2. Pupil deformation
3. Persistent uveitis (AC cells>1+)
4. Cystoid macular oedema.
5. Vitreous prolapse into anterior chamber
6. IOL decentration
7. IOL surface debris
8. Pseudophakic bullous keratopathy
9. Suture erosion

AIM OF THE STUDY

The aim of the study is to analyze---

1) The long-term functional and visual outcome

2) To analyze the long term complication profile of combined anterior vitrectomy and scleral fixated posterior chamber intraocular lens (SFIOL) implantation without adequate capsular support.

MATERIALS AND METHODS

This prospective clinical study was done to evaluate the long term functional and visual outcome and complication profile following implantation of scleral fixated posterior chamber intraocular lens (SFIOL) without capsular support.

MATERIALS

This study was done at Coimbatore Medical College Hospital, Coimbatore. The study includes 30 eyes of 25 aphakic patients and 5 primary SFIOL with a follow up of 1 year were selected, from May 2008 to December 2009.

18 other eyes with partial capsular remnants, a secondary PCIOL was implanted and their visual prognosis was assessed during the same period.

Regarding history the following data were collected: Name, age, sex, duration of aphakia, history of trauma, history of past ocular surgery, presence of diplopia. History of certain systemic diseases like Diabetes, Hypertension, Cardiac disease, Bronchial asthma. Random, Fasting and Postprandial blood sugar was taken as a routine for all patients. Blood pressure was taken in sitting position preoperatively. These patients were taken up for surgery after control of these systemic problems.

METHODS

Routine examination of anterior segment was done with slit lamp. Presence of aphakia and status of posterior capsule was noted. Presence of vitreous strands in the pupillary area and in the anterior chamber was also noted. Pupillary peeking ,posterior synechiae and the presence of peripheral iridectomy was assessed.

PREOPERATIVE VISUAL ACUITY ASSESSMENT

Baseline visual acuity without correction and with correction was obtained in all individuals with Snellen's distance visual acuity chart and near acuity chart.

INTRAOCULAR PRESSURE

Goldmann applation tonometer was used to record IOP for all cases preoperatively. Non contact Pulsair tonometer was used in all cases to record IOP postoperatively for a period of 1 month. Thereafter Goldmann applanation tonometer was used for recording the IOP. All IOP measurements were done by a single observer.

FUNDUS

Fundus oculi was examined by direct ophthalmoscopy. Also indirect ophthalmoscopy with +20 D lens was done in all cases to evaluate the periphery of the retina.

IOL POWER CALCULATION

Keratometry was done with Bausch and Lomb keratometer. K1 and K2 readings were taken. Axial length of the eye was done with the help of 'A' scan. IOL power was calculated with SRK formula using 118.2 as A constant for scleral fixation IOL.

INCLUSION CRITERIA

1) Patients with unilateral aphakia / unilateral lens subluxation or dislocation.
2) Interval between the primary procedure and the secondary IOL procedure minimum 6 weeks.

3) BCVA better than or equal to 6/24 by Snellen's visual acuity chart

4) Normal fundus as seen by direct ophthalmoscopy and +20D indirect ophthalmoscopy.

EXCLUSION CRITERIA

1) Patients with bilateral aphakia.

2) BCVA worse than 6/24 by Snellen's visual acuity chart.

3) Any fundus abnormality affecting visual function like macular degeneration,chorioretinal atrophy etc.

4) Presence of other disorders contributing to decrease in visual acuity.

5) One eyed patient.

PREOPERATIVE PREPARATION

After taking a detailed medical history and a thorough checkup including B.P., blood sugar, cardiovascular assessment respiratory system assessment, G.I assessment and CNS assessment, eyelash cutting is done.

MYDRIASIS

Preoperatively pupils were dilated with 0.5% tropicamide, 10% phenylephrine & flurbiprofen. All these drops were instilled every 15 minutes one hour before surgery. Pupillary distortion and presence of peripheral iridectomy with its patency were noted.

AKINESIA AND ANAESTHESIA

These were achieved by peribulbar injection of 2.5 ml to 5 ml of 2% xylocaine with 5 I.U./ml hyaluronidase and 1:200,000 adrenaline given with a disposable 23G needle. Peribulbar injection was given at the junction of lateral 1/3rd and medial 2/3rd of the lower lid. Adrenaline was avoided in patients with cardiovascular problems.

LOWERING OF IOP

Ocular hypotony was achieved by ocular compression using steady digital pressure on globe for 20 seconds period separated by 10 seconds interval .

CLEANING OF SKIN AND CONJUNCTIVA

Preparation included use of 5% povidone iodine to clean the surrounding skin. Skin area that was cleaned extended from midline to beyond lateral canthus and from above the eyebrow to well down onto the cheek. 5% iodine solution was applied into conjunctival cul de sac with subsequent saline wash to cleanse the conjunctiva.

DRAPING THE SURGICAL FIELD

The eye and the surrounding sterile periocular region was draped with a sterile cloth with an 3cm x 3cm round opening for the eye.

SURGICAL PROCEDURE

Step 1: Superior rectus bridle suture and Conjunctival peritomy

Superior rectus bridle suture is applied and a Conjunctival peritomy is done for 7 mm at superior limbus and 2 small peritomies are done each at 2 o'clock and 8 o'clock respectively.

Step 2: Hemostasis

Bipolar wet field cautery is used for hemostasis

Step 3: Scleral flaps

Horizontal 2/3rd thickness outer scleral flap of 6.5 mm length is made 1mm from the limbus. Two 2 mm 2/3 rd thickness scleral flaps are made 2 mm from the limbus at 2 o'clock and 8 o'clock respectively.

Step 4: AC entry

AC entry is made with a 2.8 mm diameter keratome. The keratome entry is extended upto the width of the external scleral flap i.e. 6.5 mm.

Step 6: Automated 23 G Anterior vitrectomy

A thorough Automated 23 G Anterior vitrectomy is done. Any peripheral cortical remnants are cleared with the vitrectomy.

Step 7: Railroad technique

A 26-gauge needle is passed into the vitreous cavity through the upper end of the 2 o'clock groove and directed into the pupillary space, just posterior to the iris. In the upper end of the 8 o'clock groove, 180° away, a straight needle (Ethicon STC-6 Plus) attached to a 10-0 Polypropylene suture is similarly placed and directed into the lumen of the 26-gauge needle, where it is lodged. The 26-gauge needle is withdrawn, pulling the straight needle and the attached 10-0 Polypropylene suture with it. A Polypropylene suture now spans the posterior chamber, exiting near the upper end of each groove. This technique is known as the **Railroad technique.**

Another **indigenious technique** was also used in about 15 cases where the end of a 10-0 polypropylene suture was threaded into the bore of the 26G needle and passes from the two scleral flaps into the posterior chamber .The suture was the taken out from the main scleral tunnel superiorly by Mcferson's forceps.Thus the two ends of sutures were tied to the routine PCIOL,s haptics and the IOL was implanted in the posterior chamber after centering and then sutured.

Step 8: Suture retrieval and tying to the haptics

The posterior chamber suture is retrieved with a hook, cut, and tied to the haptics of the SFIOL. Care is taken to ensure that the 2 o'clock suture is matched with the superior eyelet of the haptic and that the inferior haptic eyelet likewise related to 8 o'clock suture exiting the inferior aspect of the groove. The knots are tied to the haptic in a 3:3:2:1 pattern.

Step 9: IOL insertion, centering and burying knots in the groove.

The SFIOL is inserted into the anterior chamber and the lens was placed in the eye posterior to the iris and centered. The 2 o'clock and 8 o'clock sutures were sutured and buried in the scleral bed in the groove.

Step 10: Wound closure

A spatulated needle on 10-0 nylon suture is used to close the main superior scleral flap if it was not adequately reformed with air or saline with interrupted sutures. Anterior chamber is reformed with air.

Step 11: Conjunctival approximation and sub-conjunctival injection

Conjunctival approximation is done and 0.5 ml of subconjunctival injection containing 0.5 ml gentamicin and 0.5 ml dexamethasone is given.

POSTOPERATIVE MANAGEMENT AND EVALUATION

Eye was patched with the application of protective shield. Topical ofloxacin and dexamethasone eye drops were given for a period of 6 weeks.If postoperative inflammation was more or were anticipated to be more then 1% prednisolone with ofloxacin eye drops were given. Main scleral flap sutures were removed after postoperative 2 months.

Postoperative day 1

Patient is examined for

1) Wound approximation.
2) Corneal status.
3) Anterior chamber depth and reaction.
4) IOL centration.
5) IOP by non-contact pulsair tonometry.

Postoperative day 2

Above parameters with fundus examination with direct and indirect ophthalmoscopy.

Postoperative 1 month/ 6 months/1 year

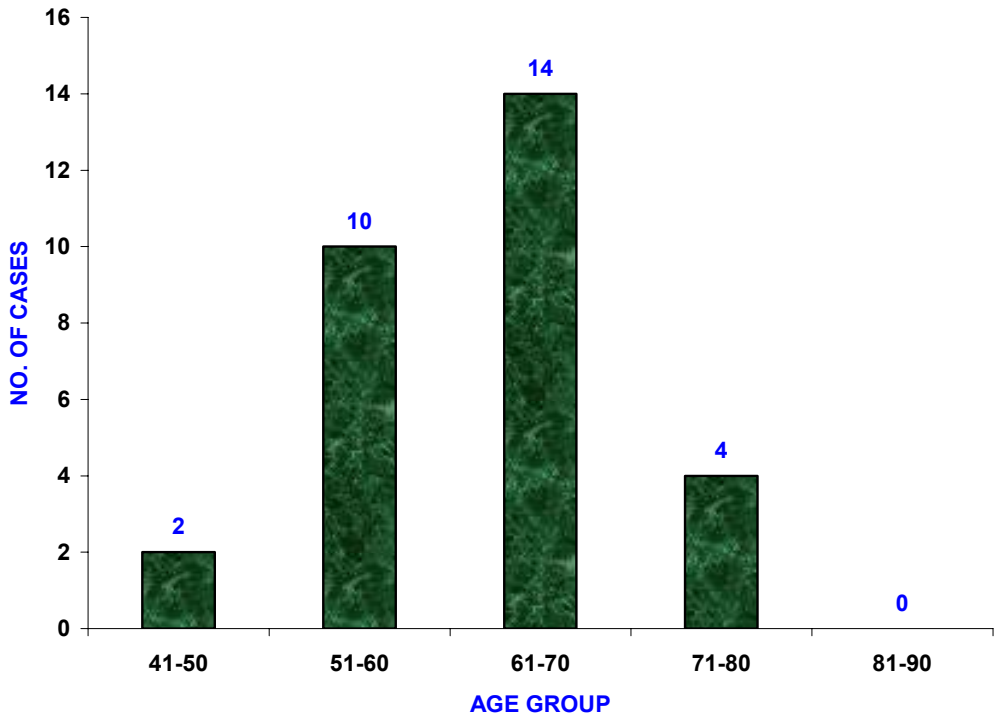
Patient was examined for

1) Visual acuity with Snellens distance visual acuity chart and Jaeger's near chart.
2) Corneal status.
3) Anterior chamber depth and reaction.
4) IOL centration and IOL surface examination.
5) IOP by Applanation tonometry.
6) Fundus evaluation by +20D indirect ophthalmoscopy and direct ophthalmoscopy.
7) Any associated complication/s.

TABLE 1

DEMOGRAPHICS

AGE GROUP	NO. OF CASES	%
41-50	2	7
51-60	10	33
61-70	14	47
71-80	4	13
81-90	0	0



In our study 47% of our patients belonged to the age group 61-70 years

TABLE 2

GENDER	NO. OF CASES	%
MALE	10	33
FEMALE	20	67

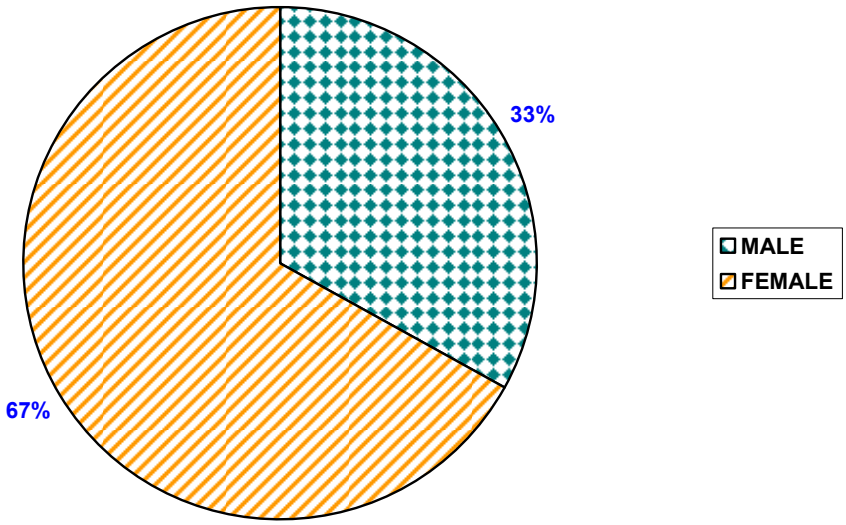
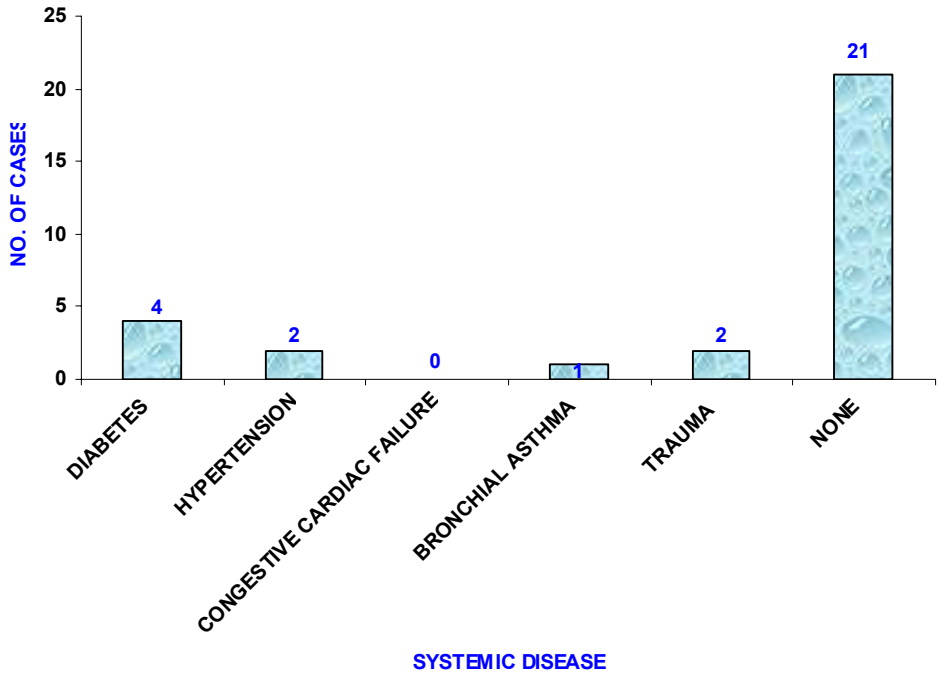


TABLE 3

SYSTEMIC DISEASE PROFILE

SYSTEMIC DISEASE	NO. OF CASES	%
DIABETES	4	13
HYPERTENSION	2	7
CONGESTIVE CARDIAC FAILURE	0	0
BRONCHIAL ASTHMA	1	3
TRAUMA	2	7
NONE	21	70



70% of the cases in our study had no active or chronic systemic illness.

TABLE 4

LATERALITY

LATERALITY	NO. OF CASES	%
RIGHT EYE	19	63
LEFT EYE	11	37

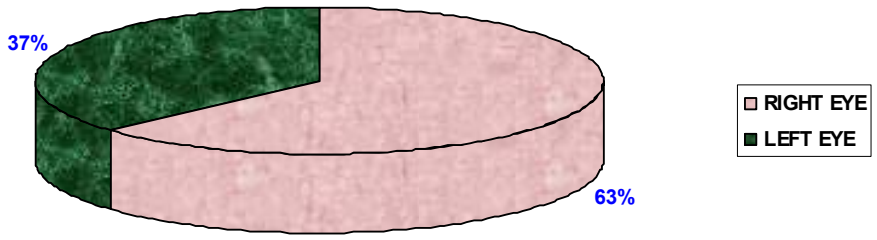
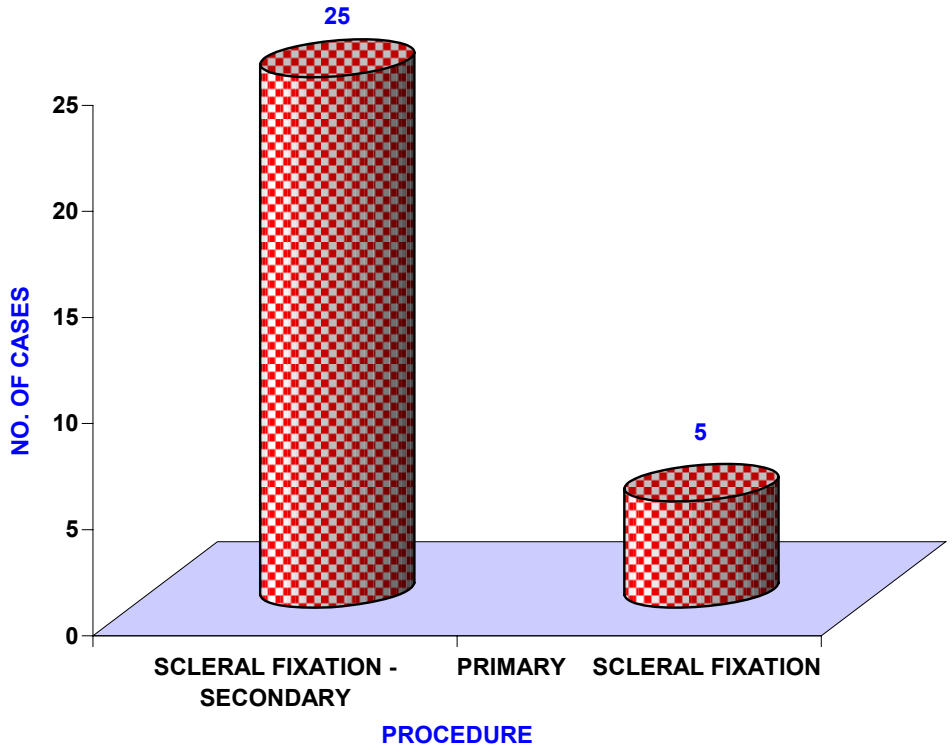


TABLE 5

PROCEDURE

PROCEDURE	NO. OF CASES	%
SCLERAL FIXATION - SECONDARY	25	83
PRIMARY SCLERAL FIXATION	5	17

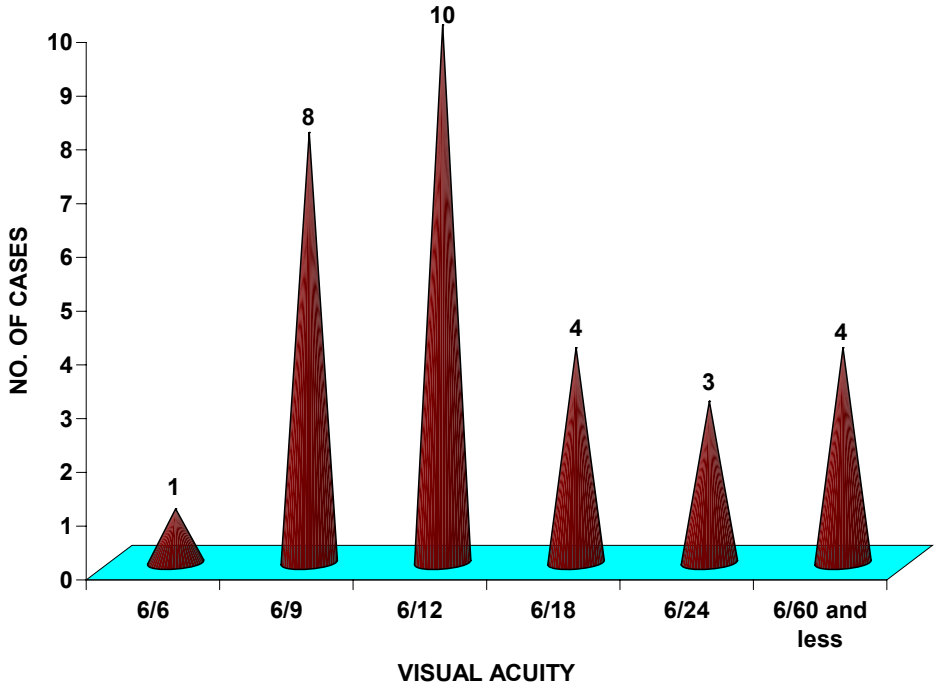


83% of the cases were aphakic. 5 cases (17%), a primary scleral fixation was done.

TABLE 6

PREOPERATIVE BCVA

VISUAL ACUITY	NO. OF CASES	%
6/6	1	3
6/9	8	28
6/12	10	33
6/18	4	13
6/24	3	10
6/60 and less	4	13

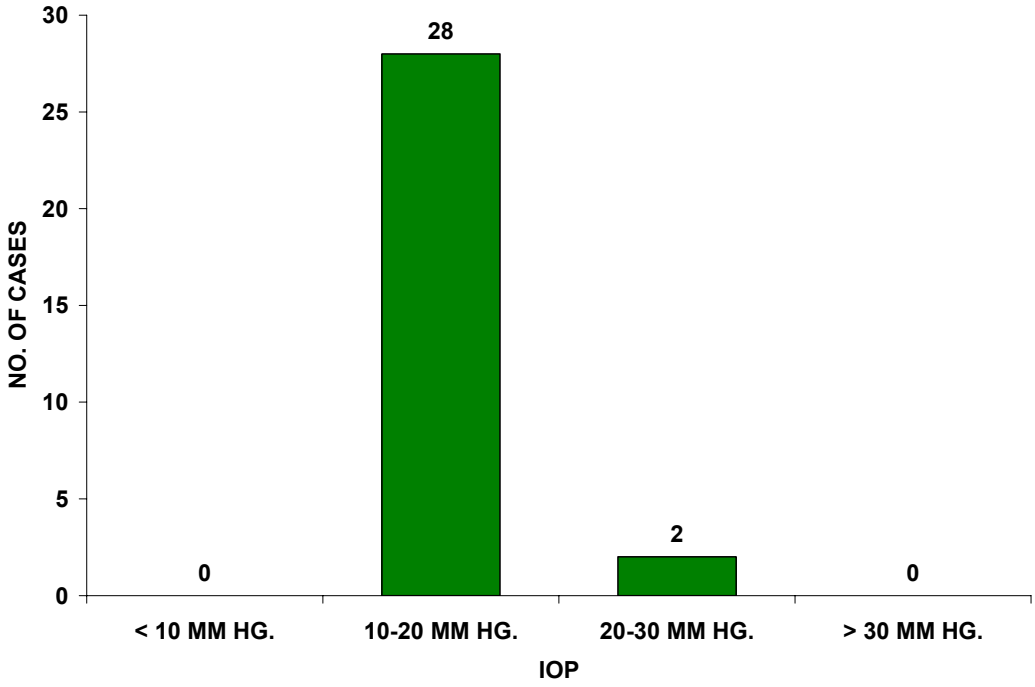


64% of cases in our series had a preoperative BCVA of 6/12 and above.

TABLE 7

PREOPERATIVE IOP

IOP	NO. OF CASES	%
< 10 MM HG.	0	0
10-20 MM HG.	28	93
20-30 MM HG.	2	7
> 30 MM HG.	0	0

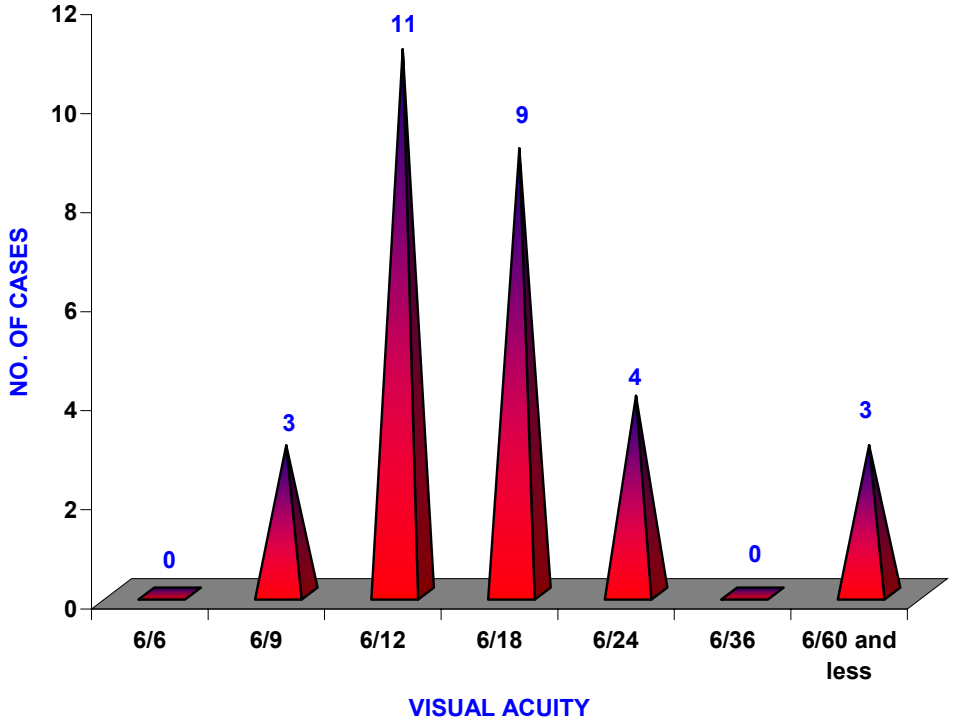


93% of our patients had an normal IOP (20-30mm Hg).

TABLE 8

BCVA 24 HOURS POSTOPERATIVELY

VISUAL ACUITY	NO. OF CASES	%
6/6	0	0
6/9	3	10
6/12	11	37
6/18	9	30
6/24	4	13
6/36	0	0
6/60 and less	3	10

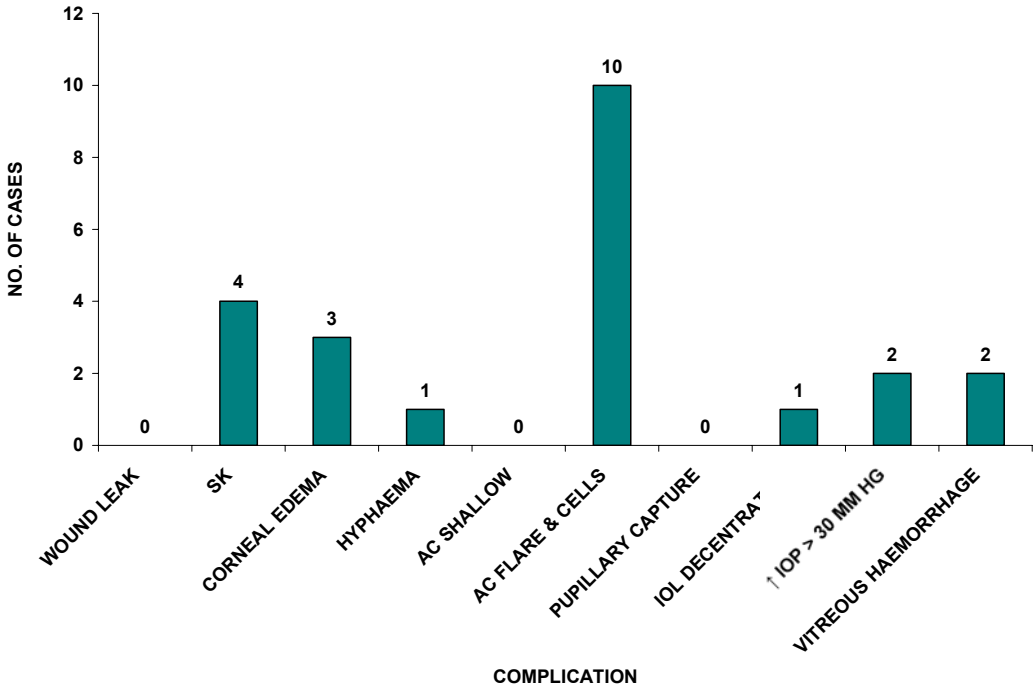


BCVA of 6/12 was observed in 11 cases (37%) in the first postoperative day.

TABLE 9

COMPLICATION PROFILE 24 HOURS POSTOPERATIVELY

COMPLICATION	NO. OF CASES	%
WOUND LEAK	0	0
SK	4	13
CORNEAL EDEMA	3	10
HYPHAEMA	1	3
AC SHALLOW	0	0
AC FLARE & CELLS	10	33
PUPILLARY CAPTURE	0	0
IOL DECENTRATION	1	3
↑ IOP > 30 MM HG	2	7
VITREOUS HAEMORRHAGE	2	7

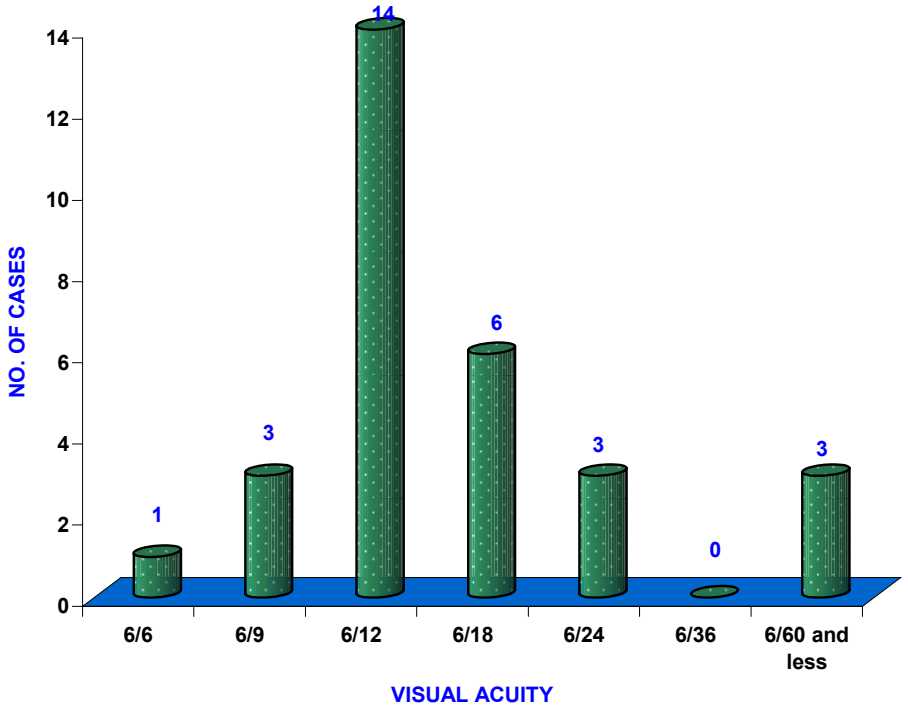


10 cases (33%) had mild flare and cells in the first Postoperative Period.

TABLE 10

BCVA 1 MONTH POSTOPERATIVELY

VISUAL ACUITY	NO. OF CASES	%
6/6	1	3
6/9	3	10
6/12	14	47
6/18	6	20
6/24	3	10
6/36	0	0
6/60 and less	3	10

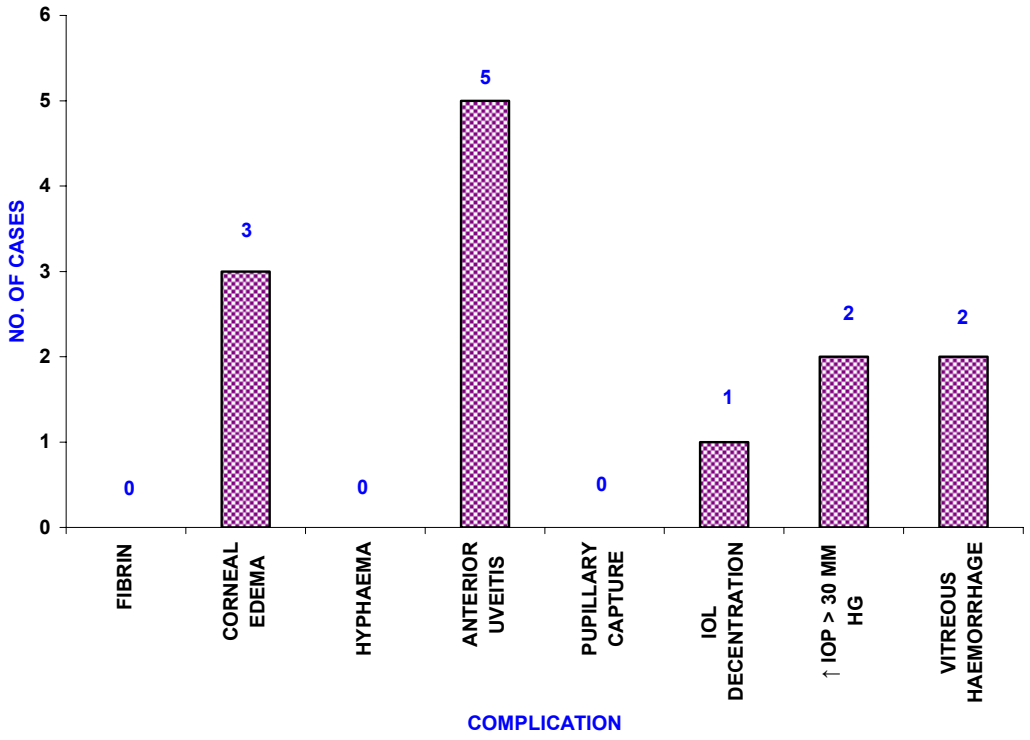


47% of the cases had a BCVA of 6/12 at one month.

TABLE 11

COMPLICATION PROFILE 1 MONTH POSTOPERATIVELY

COMPLICATION	NO. OF CASES	%
FIBRIN	0	0
CORNEAL EDEMA	3	10
HYPHAEMA	0	0
ANTERIOR UVEITIS	5	17
PUPILLARY CAPTURE	0	0
IOL DECENTRATION	1	3
↑ IOP > 30 MM HG	2	7
VITREOUS HAEMORRHAGE	2	7

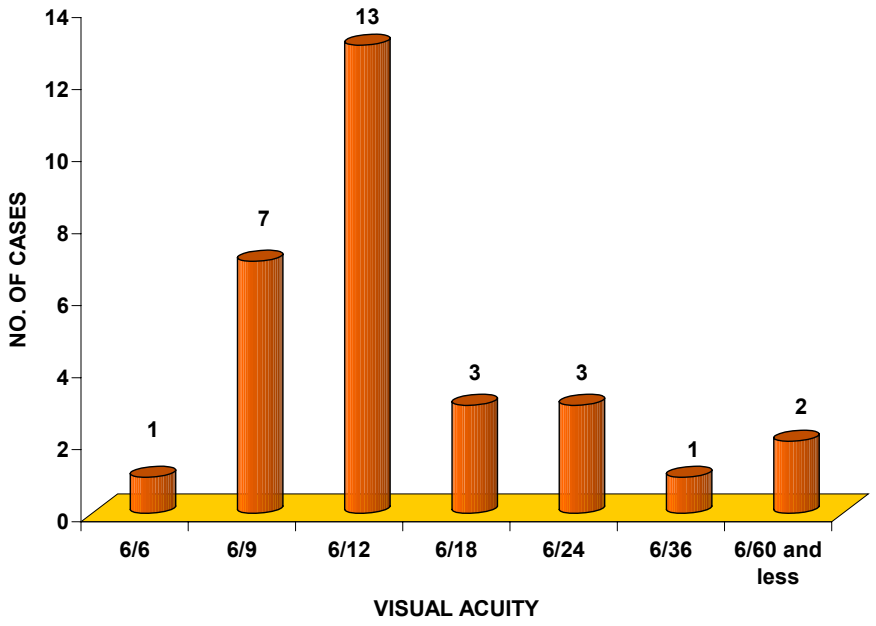


5 cases (17%) had anterior uveitis. 2 cases had vitreous haemorrhage.

TABLE 12

BCVA 6 MONTHS POSTOPERATIVELY

VISUAL ACUITY	NO. OF CASES	%
6/6	1	3
6/9	7	23
6/12	13	44
6/18	3	10
6/24	3	10
6/36	1	3
6/60 and less	2	7



70% (21 cases) had a BCVA of 6/12 and above at 6 months postoperative.

TABLE 13

COMPLICATION PROFILE 6 MONTHS POSTOPERATIVELY

COMPLICATION	NO. OF CASES	%
GLAUCOMA	0	0
PUPIL DEFORMATION	0	0
PERSISTENT UVEITIS	2	7
CYSTOID MACULAR EDEMA	2	7
VITREOUS PROLAPSE IN ANTERIOR CHAMBER	1	3
IOL DECENTRATION	1	3
SUTURE EROSION	0	0
IOL SURFACE DEBRIS	1	3

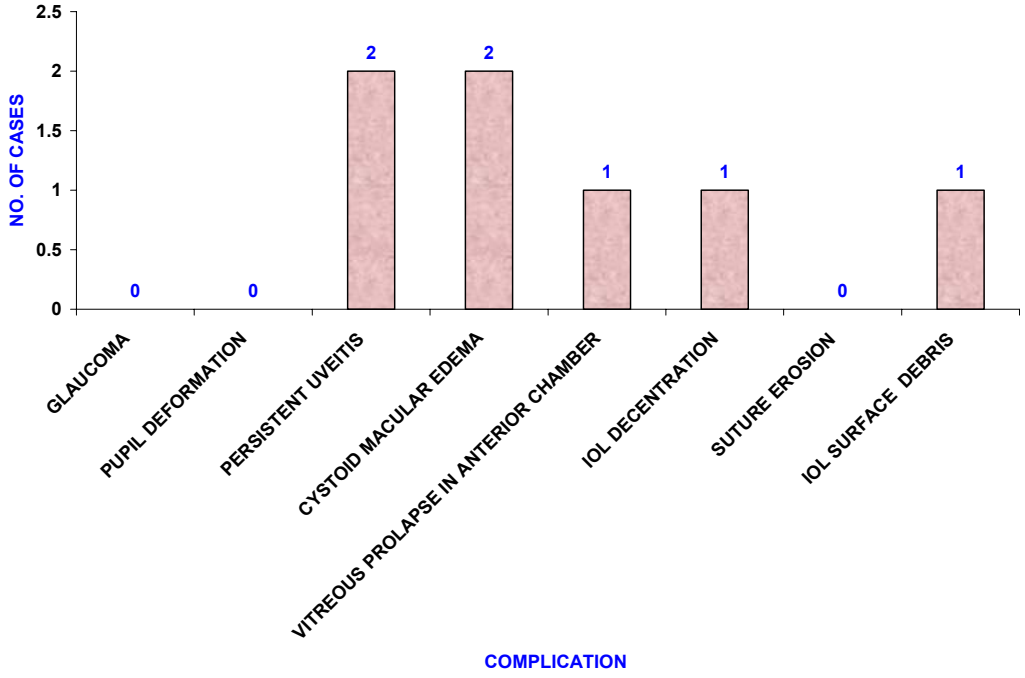
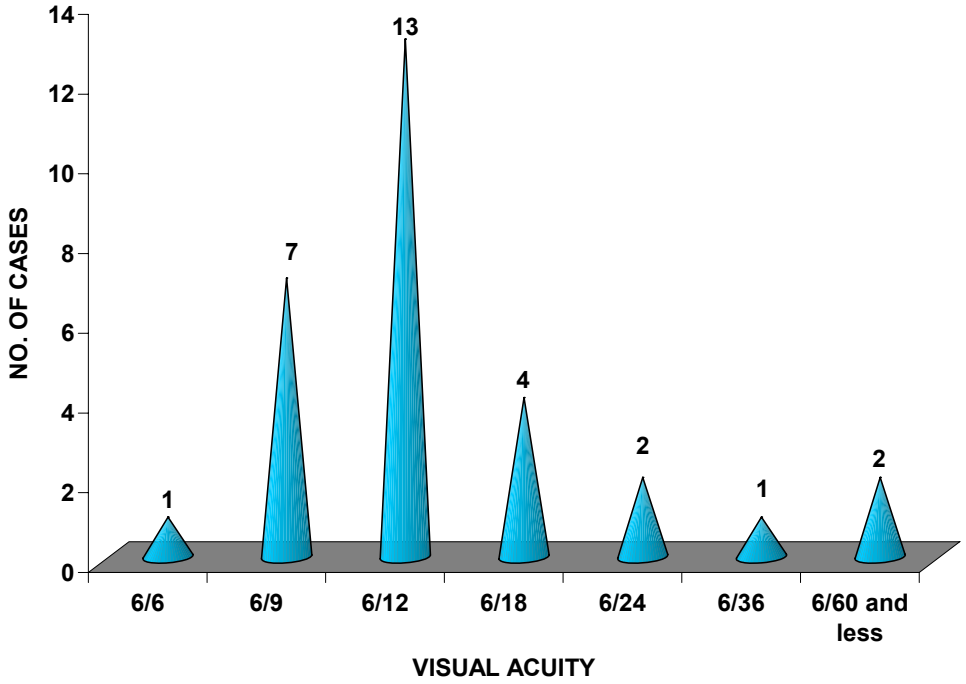


TABLE 14

BCVA 1 YEAR POSTOPERATIVELY

VISUAL ACUITY	NO. OF CASES	%
6/6	1	3
6/9	7	23
6/12	13	44
6/18	4	13
6/24	2	7
6/36	1	3
6/60 and less	2	7

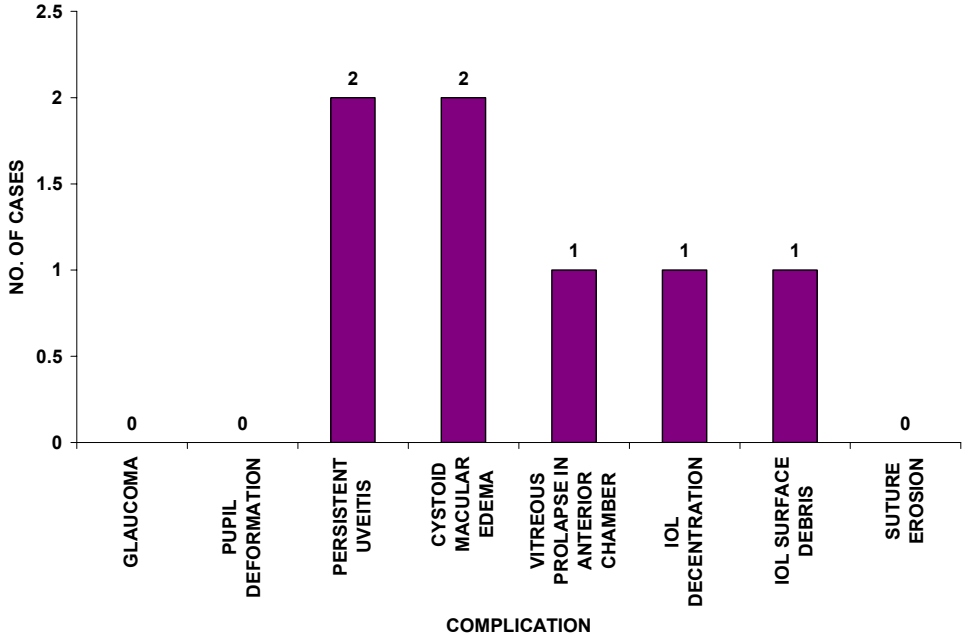


70% cases in our study had a BCVA of 6/12 and above at 1 year

TABLE 15

COMPLICATION PROFILE 1 YEAR POSTOPERATIVELY

COMPLICATION	NO. OF CASES	%
GLAUCOMA	0	0
PUPIL DEFORMATION	0	0
PERSISTENT UVEITIS	2	7
CYSTOID MACULAR EDEMA	2	7
VITREOUS PROLAPSE IN ANTERIOR CHAMBER	1	3
IOL DECENTRATION	1	3
IOL SURFACE DEBRIS	1	3
SUTURE EROSION	0	0

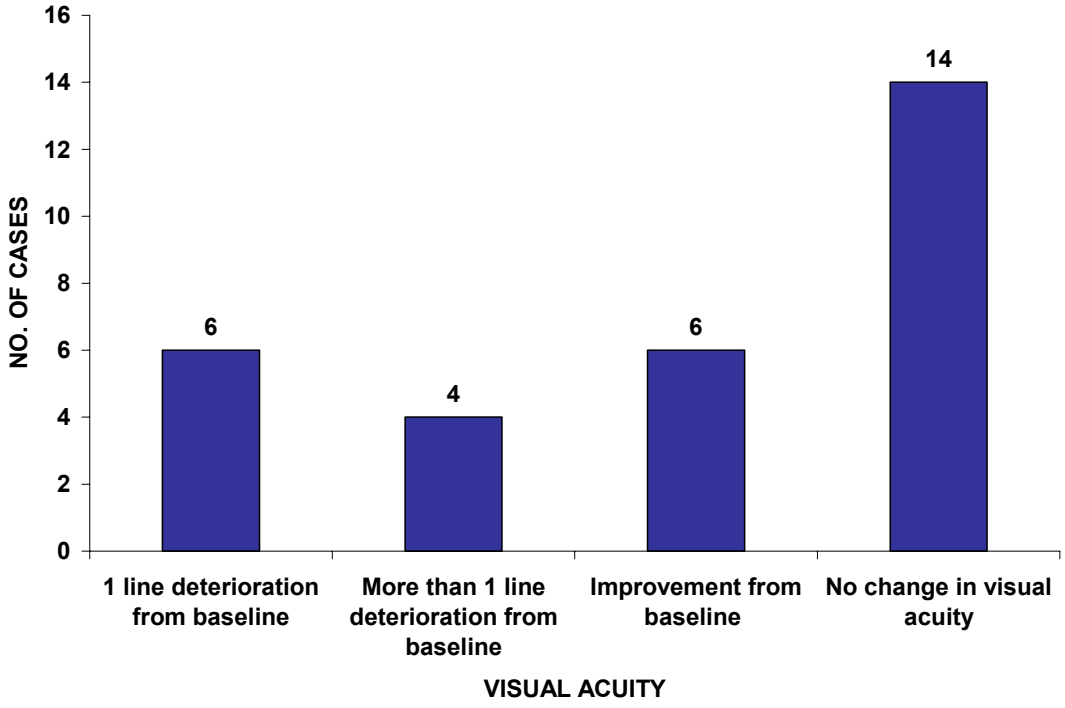


In our study persistant uveitis was seen in 7% of cases & CMO in 7% of cases

TABLE 16

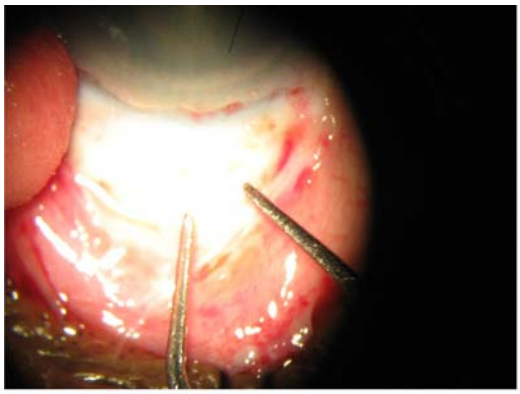
CHANGES IN VISUAL ACUITY AT THE END OF 1 YEAR

VISUAL ACUITY	NO. OF CASES	%
1 line deterioration from baseline	6	20
More than 1 line deterioration from baseline	4	13
Improvement from baseline	6	20
No change in visual acuity	14	47

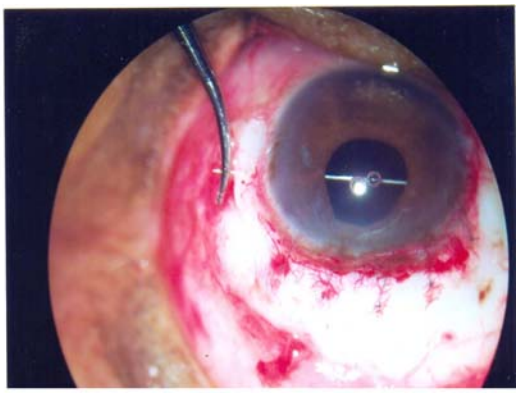


47% cases in our study had no change in visual acuity from preoperative BCVA.20% had one line deterioration.

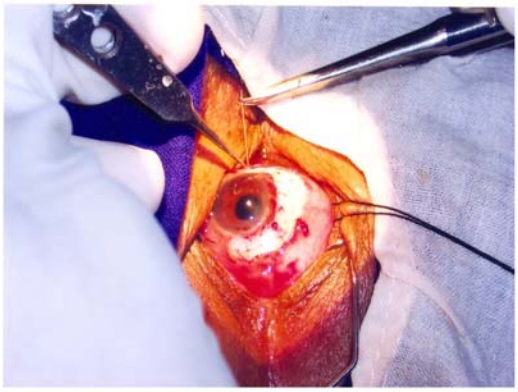
RAIL ROAD TECHNIQUE



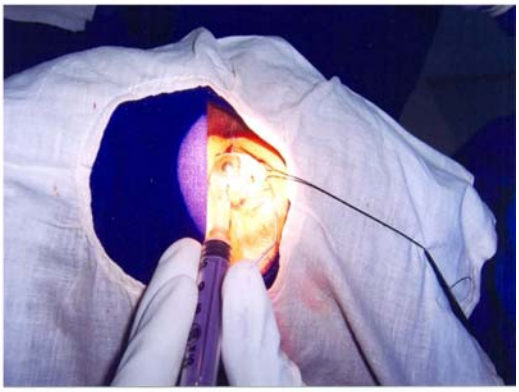
1. CONJUNCTIVAL PERITOMY AND BIPOLAR CAUTERY



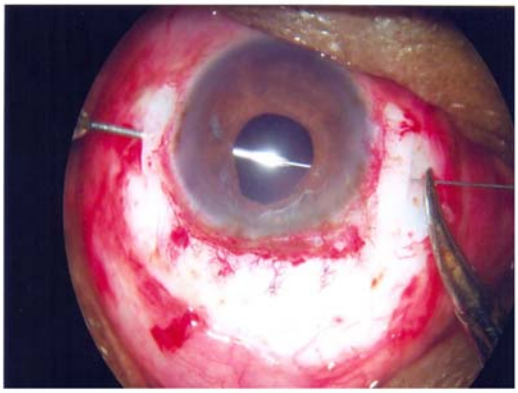
2A. PASSAGE OF STRAIGHT NEEDLE



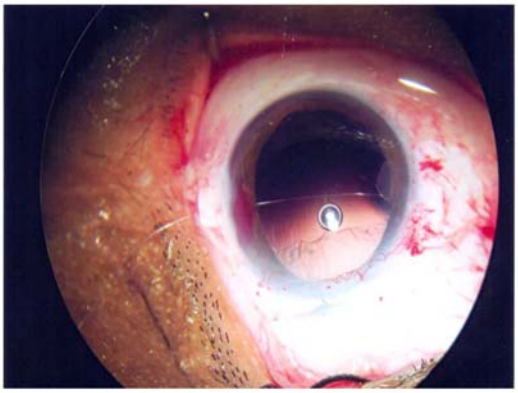
2B. PASSAGE OF STRAIGHT NEEDLE



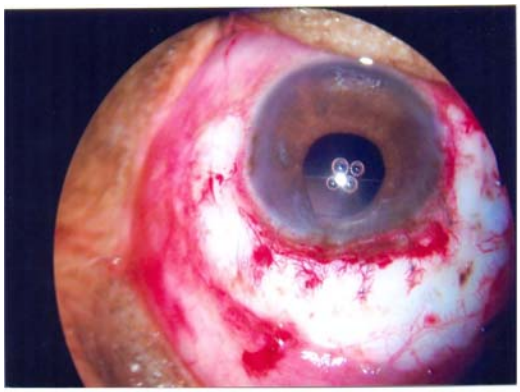
3. PASSAGE OF 26 G NEEDLE THROUGH OPPOSITE SIDE



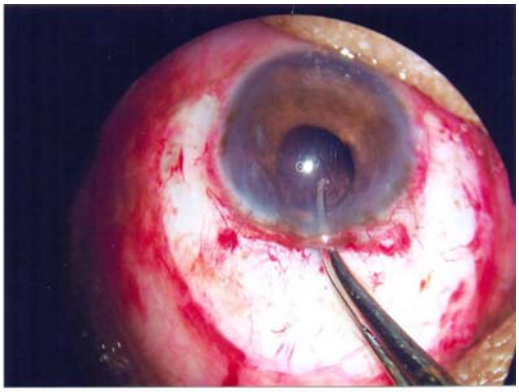
4. RAIL ROAD TECHNIQUE



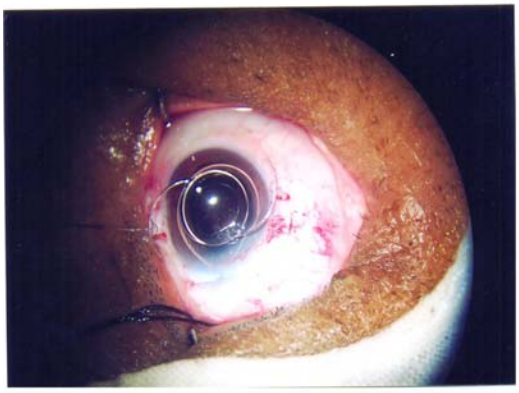
5. 10-0 PROLENE IN THE POSTERIOR CHAMBER



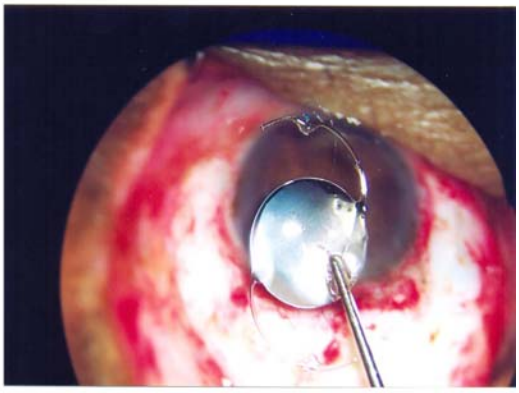
6. 10-0 PROLENE IN POSTERIOR CHAMBER



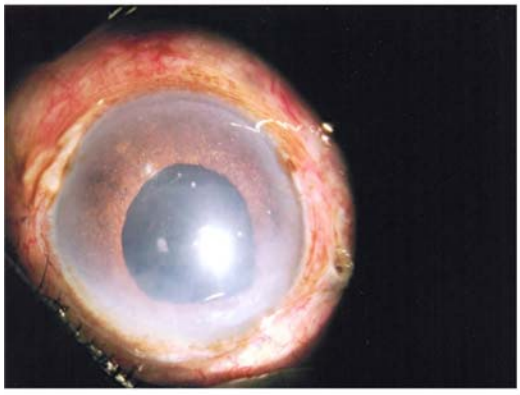
7. SUTURE RETRIEVEL THROUGH MAIN PORT



8. TYING KNOT TO SUPERIOR HAPTIC

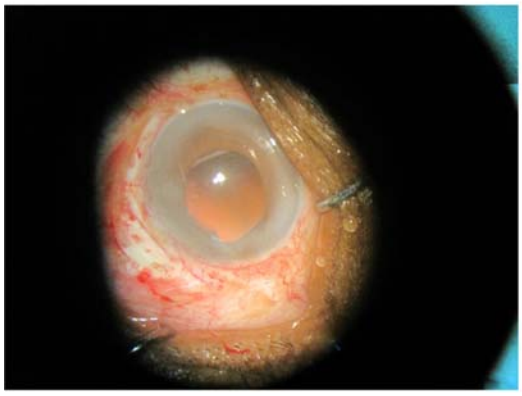


9. TYING KNOT TO BOTH HAPTICS

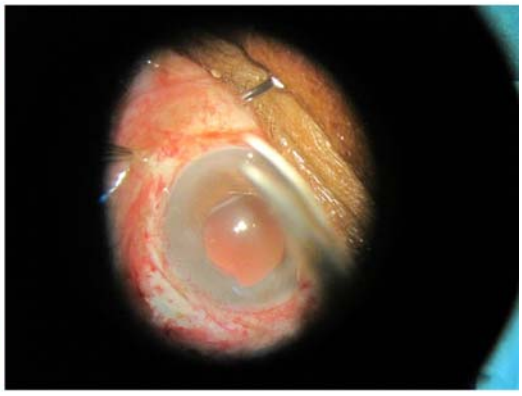


10. IOL INSERTION, CENTERING AND WOUND CLOSURE

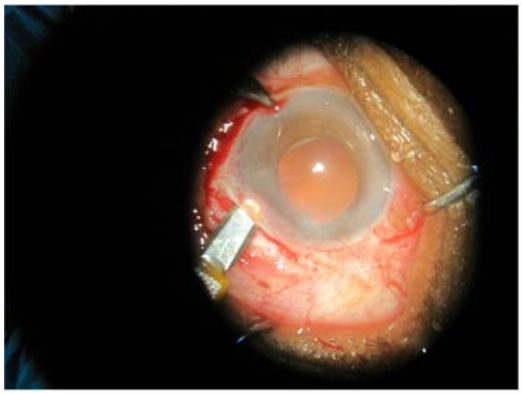
INDIGENIOUS TECHNIQUE



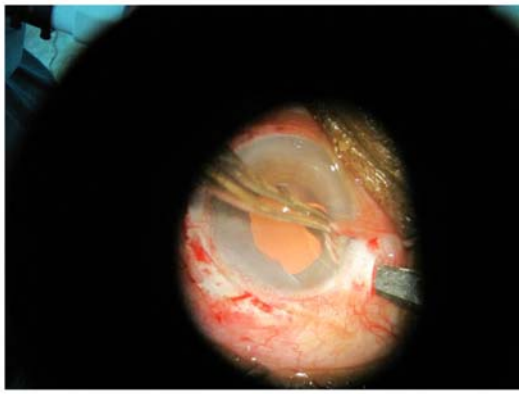
APHAKIA



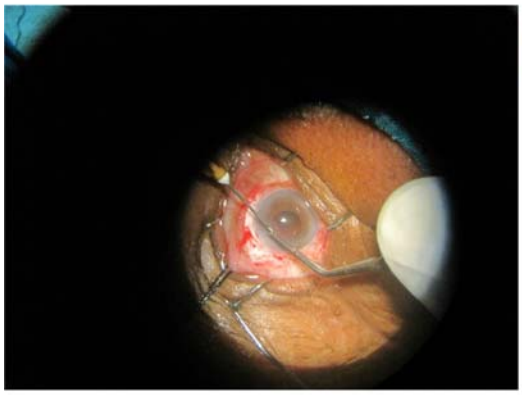
SUPERIOR SCLERAL GROOVE



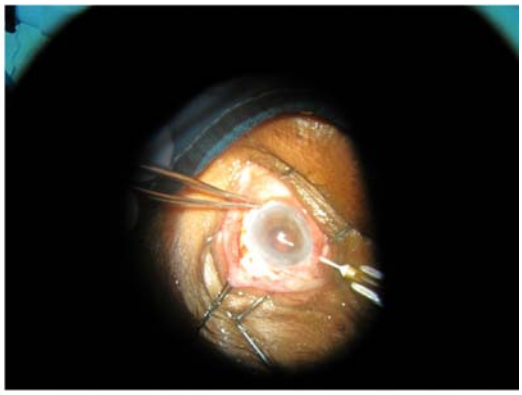
SCLERAL TUNNEL



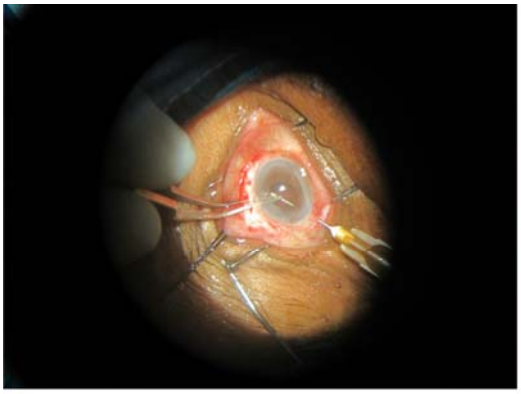
SIDE TUNNEL 8º O CLOCK



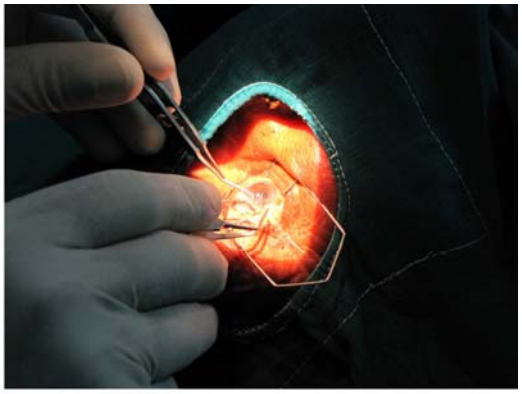
THREADING THE 10º SILK
INTO THE BORE OF 26G NEEDLE



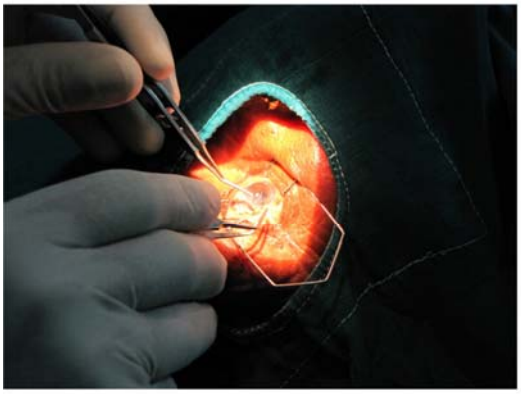
ENTRY INTO THE POSTERIOR
CHAMBER



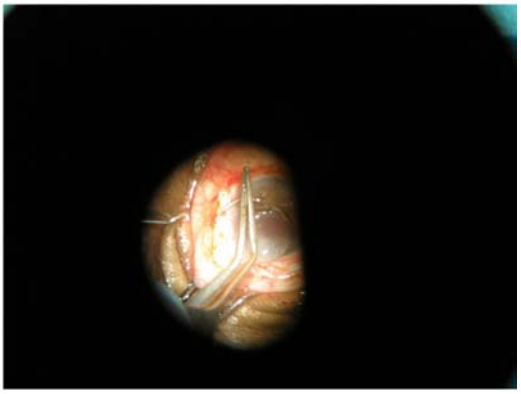
PULLING THE SUTURE THROUGH
THE MAIN TUNNEL



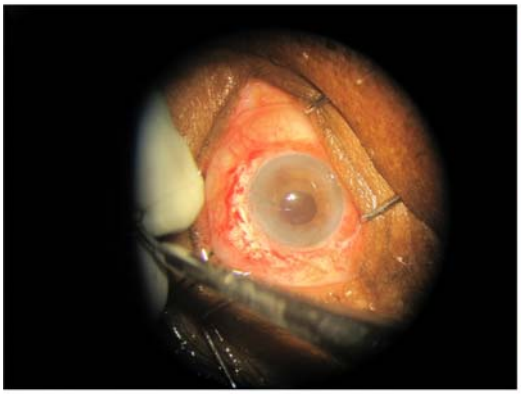
TYING THE SUTURE TO
THE HAPTIC



TYING THE SUTURE TO
EITHER HAPTIC

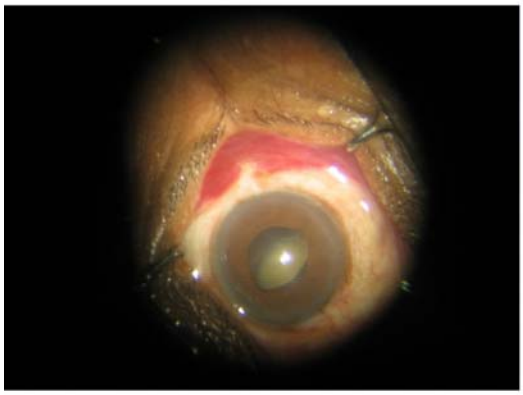


TYING THE SUTURE TO
EITHER HAPTIC



IOL READY FOR INSERTION

IOL INSERTED AND CENTERED



SUBLUXATED LENS

PRIMARY SFIOL
FIRST POST OPERATIVE PERIOD
- 24 HOURS

PRIMARY SFIOL
POST OPERATIVE PERIOD
- THIRD MONTH

PRIMARY SFIOL
POST OPERATIVE PERIOD
- SIX MONTH

APHAKIA

SECONDARY SFIOL 1ST POST OPERATIVE PERIOD

POST OPERATIVE PERIOD - 1 WEEK

POST OPERATIVE PERIOD - 3 MONTH

POST OPERATIVE PERIOD - 6 MONTH

LONGTERM FUNCTIONAL OUTCOME

Excellent long term(1 year) visual outcomes were achieved in our study of scleral fixation IOL's .The preoperative best corrected visual acuity(BCVA) was used as a control to assess the final visual outcome .More than 86% of the patients achieved a postoperative BCVA within one line of the preoperative best corrected visual acuity.

Loss of more than one line from baseline was attributed to cystoid macular edema in two eyes, persistent uveitis and IOL surface debris was the reason in two other eyes.

One eye had a slightly decentered IOL, but the long term visual outcome was not affected . In our series no suture erosion was encountered, as we had buried the knot in the inferior and superior groove. A adequate anterior vitrectomy and placement of the IOL as close to the ciliary sulcus were the reason for the good long term visual outcome.

In the other 18 Aphakic eye which had partial capsular remnants ,a PCIOL was implanted over it.The capsular remnants and the condensed anterior hyloid phase provided adequate support for the IOL to be in place.The postoperative complications were mild ranging from mild iritis to mild corneal edema in few cases which resolved within the first postoperative week.The IOL in all cases were well centered and visual acuity were equal or better than the preoperative BCVA.

Thus placing a secondary PCIOL in an eye with doubtful capsular support with a condensed anterior vitreous phase is a good if not a better alternative for SFIOL.

OBSERVATIONS

A prospective study of 30 cases was done from May 2008 to December 2009 with patients undergoing Scleral fixation IOL. Out of these 10 were males and 20 females accounting for 33% and 67% respectively. Mean age was found to be 65 years.. Types of patients considered include unilateral aphakics with a minimum interval between primary and secondary procedure of 6 weeks and patients who were implanted SFIOL as a primary procedure. There 25 aphakic patients who underwent secondary SFIOL accounting for 83% of the total and 5 patients who underwent a primary SFIOL accounting for 17%. 18 aphakics with partial capsular remnants underwent secondary PCIOL during the same period.

The mean interval between the initial cataract surgery and secondary SFIOL implantation was 14.25 weeks (range 6 weeks to 72 weeks).

All 30 cases underwent automated 23 G anterior vitrectomy and scleral fixation IOL. There were intraoperative complications like vitreous hemorrhage in 2 cases, in 3 cases the suture broke while tying the knot and the procedure was redone again from the beginning and surgery was uneventful rest of the cases.

Immediate postoperative complications – AC flare and cells were seen in 10 cases (33%),striate keratopathy was seen in 4 cases (13%), corneal edema was seen in 4 cases (13%) .

Late postoperative complications – persistent uveitis was seen in 2 case (7 %), cystoid macular edema was seen in 2 case (7%),vitreous prolapse in anterior chamber was seen in 1 case (3%),IOL decentration was seen in 1 case (3%).

DISCUSSION

In our case series study of 30 cases, 25 cases were taken up for secondary suturing of scleral fixation IOL.

Five cases, of which 2 were traumatic subluxted cataractous lens and the rest (3 cases) ,had a large capsular tear during routine small incision cataract surgery ,were taken up for primary suturing of scleral fixation IOL. The mean follow up period was 12 months.the best corrected visual acuity of 6/12 and above was seen in 21 cases (70%).

Two cases of traumatic subluxated lens who underwent primary fixation had a BCVA at 1 year of 6/60 and 6/36 respectively. They had mild persistant uveitis. The visual acuity was better than the preoperative best corrected vision.

IOL decentration was observed in one case,but did not affect the visual acuity significantly as it was minimal.

Vitreous prolapse was observed in one case.

Cystoid macular edema was seen in one case who had a vitreous haemorrhage in the immediate postoperative period which cleared after 6 months.The BCVA was 6/60.

COMPARISON WITH PREVIOUS STUDIES

1. **Chang and Lee**[62] did a case series study of 18 cases of uncomplicated secondary suturing of scleral fixation IOL. Their study showed a Visual outcome of 20/40 or better in 14 (77.8%) and of 20/200 or worse in 3 (16.7%)

of patients. Corneal edema was seen in 2 (11.1%) and Glaucoma escalation in 1 (5.6%). None of the patients had cystoid macular edema, retinal detachment and endophthalmitis.

In Our study 70% had BCVA of 6/12 and above .None had Retinal detachment, or endophthalmitis.CME was observed in 2 cases.

2. **Menezo et al**[63] did a case series study of 13 cases of uncomplicated secondary suturing of scleral fixation IOL. Their study showed a visual outcome of 20/40 or better in 10 (76.9%) and of 20/200 or worsein 2 (15.3%) of patients. Corneal edema was seen in 1 (7.6%) and Glaucoma escalation in 4 (30.7%). Cystoid macular edema was seen in 1 (7.6%). Lens tilt or dislocation was seen in 2 (15.3%) patients. Endophthalmitis was seen in 1 (7.6%).

   No lens tilt or endohthalmitis was seen in our series.Corneal edema was seen in the immediate postoperative period and which resolved by two months.

3. **Helal et al**[64] did a case series study of 41 cases of uncomplicated secondary suturing of scleral fixation IOL. Their study showed a visual outcome of 20/40 or better in 25 (61.0%) and of 20/200 or worse in none. Glaucoma escalation was seen in 1 (2.4%) and Lens tilt or dislocation in 1 (2.4%). Retinal detachment was seen 1 (2.4%).

4. **McCluskey and Harrisberg**[65] did a case series study of 12 cases of uncomplicated secondary suturing of scleral fixation IOL. Their study showed a visual outcome of 20/40 or better in 7 (58.3%) and of 20/200 or worse in 2 (16.7%). Suture erosion was seen in 1 (8.3%) patient.

No suture erosion was observed in our study,as we had buried the suture knot under the scleral groove .

5. The large series of secondary scleral-sutured PC IOLs by **Lyle and Jin**[66] , more than 90% of eyes achieved a BCVA of 20/40 or better. If risk factors such as glaucomatous optic nerve damage or maculopathy were present, the percentage of eyes achieving a BCVA of 20/40 or better was reduced to 66%. The incidence of retinal detachment was 3.5%; lens tilt or dislocation, 2.6%; and endophthalmitis, 0.9%.

   In our series cases with risk factors were not included. All cases had undergone an anterior vitrectomy, thus eliminating the traction component and the lens were laced as close to the ciliary sulcus as possible.This could explain the abscence of retinal detachment in our study.

6. **Belluci et al**[67] achieved similar visual outcomes, with a retinal detachment rate of 6%, lens tilt or dislocation of 12%, and no cases of endophthalmitis.

SUMMARY AND CONCLUSION

A prospective study was conducted at Coimbatore Medical College Hospital, Coimbatore from May 2008 to December 2009 which included 30 eyes of 25 aphakic patients, 5cases of primary scleral fixation lenses and with a follow up of 1 year were evaluated for long-term functional and visual outcome . The complication profile for combined anterior vitrectomy and scleral fixated posterior chamber intraocular lens (SFIOL) implantation without adequate capsular support were studied.

Results concluded that scleral fixation procedure was a safe procedure with a success rate of 93% . Most preoperative complications were minor: suture break while tying the knot after centering the IOL was observed in 3 cases,and the procedure was redone again. Post operative complications encountered were mild iritis in 1 cases , one eyes had a decenteration of IOL , 4 eye had a striate keratopathy which cleared in the second postoperative period.

Two eyes had intraoperative vitreous haemorrhage, which cleared after 3months postoperarative, two patients ,who had a traumatic subluxation and SFIOL implanted had chronic anterior uveitis which did not improve beyond 6/60 and 6/36 at 6 months follow up.Visual acuity was assessed at second day,at one month and three month . Scleral fixation of PCIOLs can be visually rewarding in most cases.Most cases improved from one line to three lines in snellens visual acuity chart. The postoperative astigmatism ranged from 1.5D to as high as 3.5D.

Precise determination of small differences in visual outcome or complication rates will require a large prospective, randomized clinical trial.

CONCLUSION

In this study combined anterior vitrectomy and scleral fixated posterior chamber intraocular lens (SFIOL) implantation was found to have the following outcome:

1. Combined anterior vitrectomy and scleral-fixated sutured PC IOL implantation is an effective and safe procedure to correct aphakia in eyes without capsular support..

2. The most dreaded complication of retinal detachment, suture lysis and infection was not encountered.

3. Discomfort and anisekonia from wearing aphakic spectacles, and the devastating complications from ACIOL implantation (such as bullous keratopathy, glaucoma, CME etc…) are avoided with SFIOL implantation as there is anatomic placement of the IOL in the posterior segment.

4. If there is peripheral capsular support and an condensed anterior hyaloid phase a secondary PCIOL implantation can be tried .In a skilled surgeon it is a safer alternative than an SFIOL.

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PROFORMA

"MANAGEMENT OF POSTERIOR CAPSULAR TEAR WITH SCLERAL FIXATION LENSES" A PROSPECTIVE STUDY

1) NAME :

2) AGE: YEARS **3) SEX: MALE / FEMALE**

4) I.P. NO.: **5) MRD. NO. :**

6) DATE OF ADMISSION :

DATE OF SURGERY :

DATE OF DISCHARGE :

7) ADDRESS:

8) EYE INVOLVED : RIGHT EYE / LEFT EYE

9) PRESENTING COMPLAINTS:

a) **Diminution of vision**
   Distant vision
   Near vision
b) **Duration**
c) **Other complaints**

10) PAST HISTORY : **(IF YES, DURATION)**

a) H/O Trauma	**: YES/NO**	
b) H/O Congenital anomalies	**: YES/NO**	
c) H/O Diabetes mellitus	**: YES/NO**	**YRS.**
d) H/O Hypertension	**: YES/NO**	**YRS.**
e) H/O Anticoagulant use	**: YES/NO**	
f) H/O Congestive cardiac failure	**: YES/NO**	**YRS.**
g) H/O Bronchial asthma	**: YES/NO**	**YRS.**
h) H/O Genitourinary symptoms	**: YES/NO**	
i) Other significant history :		

11) PREVIOUS SURGICAL HISTORY:

a) Indication :
b) Surgical procedure done:
c) Duration between first and present surgery :

12) PREOPERATIVE VISUAL ACUITY (VA)

a) UCVA : **b) BCVA :**

d) Type of correction :

13) PREOPERATIVE OCULAR EXAMINATION :

Facial Symmetry

	RE	LE
Position		
Extra-ocular movements		
Eyelids		
Eyebrows		
Eyelashes		
Conjunctiva		
Cornea		
Anterior chamber		
Iris (look for PI)		
Pupils		
Size		
Shape		
Reaction		
Synechiae		
Lens & presence of PC		
Vitreous		
Retina		
Direct		
Indirect		
SLB		
Intraocular pressure		
Gonioscopy		
Nasolacrimal duct		

14) DIAGNOSIS : **RE** **LE**

15) INVESTIGATIONS :

A. Routine:

- **Haemogram**
- **CVS**
- **RS**
- **GIT**
- **CNS**
- **Others**

B. Ocular

IOL Power calculation

1. **K1 reading**
2. **K2 reading**
3. **Axial length**
4. **IOL power (SRK formula)**

A scan

B scan

16) SURGERY

a) Name of the operating surgeon:

b) Anesthesia:

c) Operative procedure done:

17) PER-OPERATIVE COMPLICATIONS:

a) Vitreous hemorrhage
b) Globe perforation
c) Descemets membrane tear
d) Vitreous loss
e) RD
f) others

Management:

18) COMPLICATIONS 24 HRS. POSTOPERATIVE.

a) Wound leak
b) SK
c) Corneal edema
d) Hyphema
e) A C shallow
f) AC flare and cells
g) Pupillary capture
h) IOL decentration
i) ↑ IOP > 30 mm Hg.
j) Vitreous hemorrhage

Management:

19) COMPLICATIONS 1 MONTH POSTOPERATIVELY

a) Fibrin
b) Corneal edema
c) Hyphema
d) Anterior uveitis
e) Pupillary capture
f) IOL decentration
g) ↑ IOP > 30 mm Hg.
h) Vitreous hemorrhage

Management:

20) COMPLICATIONS 6 MONTH POSTOPERATIVELY

a) Glaucoma
b) Pupil deformation

c) Persistent uveitis
d) CME
e) Vitreous prolapse in anterior chamber
f) IOL decentration
g) IOL surface debris
h) PBK
i) Suture erosion

Management:

21) COMPLICATIONS 1 YEAR POSTOPERATIVELY

a) Glaucoma
b) Pupil deformation
c) Persistent uveitis
d) CME
e) Vitreous prolapse in anterior chamber
f) IOL decentration
g) IOL surface debris
h) PBK
i) Suture erosion

Management:

22) FOLLOW-UP AND POSTOPERATIVE BCVA

a) at 24 hours :

b) at 1 month :

c) at 6 months :

d) at 1 year :

23) INFERENCE:

KEY TO MASTER CHART

SEX:

M – MALE

F – FEMALE

EYE INVOLVED:

RE – RIGHT EYE

LE – LEFT EYE

PAST HISTORY:

T – TRAUMA

C – CONGENITAL ANOMALIES

D – DIABETES MELLITUS

H – HYPERTENSION

A – ANTICOAGULANT USE

F – CONGESTIVE CARDIAC FAILURE

B – BRONCHIAL ASTHMA

G – GENITOURINARY ANOMALIES

O – OTHERS

N – NONE

PRESENTATION:

A – APHAKIA

C-CATARACT

SL-SUBLUXATED CATARACTOUS LENS

COMPLICATION PROFILE:

SK – STRIATE KERATOPATHY

CE – CORNEAL EDEMA

HY – HYPHEMA

AC – AC FLARE AND CELLS

IO – INCREASED IOP

AU – ANTERIOR UVEITIS

ID – IOL DECENTRATION

GL – GLAUCOMA

CM – CYSTOID MACULAR EDEMA

VH– VITREOUS HAEMORRHAGE

SD – IOL SURFACE DEBRIS

SE – SUTURE EROSION

MASTER CHART.

S. No.	Age	Sex	Eye	Past H/O	Duration	Presentation	K1	K2	IOL power	BCVA preop	24 hrs.	1 month	6 months	1 year	Compli. 24 hrs.	1 month	6 months	1 year
1	55	F	LE	H	6months	A	45.75	46.20	+18.00	6/12	6/18	6/12	6/12	6/12	-	-	-	-
2	60	F	RE	N	-	A	44.75	45.00	+26.50	6/6	6/9	6/6	6/6	6/6	AC	-	-	-
3	60	F	RE	N	-	A	42.00	43.20	+23.50	6/24	6/18	6/18	6/18	6/18	SK,AC	AU	-	-
4	65	F	RE	N	-	A	42.70	42.70	+26.50	6/9	6/18	6/9	6/9	6/9	-	-	-	-
5	70	F	RE	H	1month	A	45.25	48.00	+22.00	6/12	6/18	6/18	6/12	6/12	CE	CE	-	-
6	48	F	LE	N	-	A	45.25	46.25	+26.50	6/18	6/18	6/18	6/12	6/12	AC	-	-	-
7	70	M	LE	N	-	A	42.70	41.50	+21.50	6/12	6/24	6/24	6/24	6/24	CE,VH	CE,VH	CM	CM
8	44	M	RE	N	-	A	40.50.	43.75	+20.50	6/18	6/24	6/24	6/24	6/24	-	-	-	-
9	55	M	RE	T	3 years	SL	46.00	43.25	+17.50	6/24	6/60	6/60	6/60	6/60	,AU,IO	AU,IO	AU,VP	AU,VP
10	60	F	RE	D	2 years	A	44.00	45.25	+22.00	6/24	4/60	6/60	6/60	6/60	VH,AU	VH	VH	CM
11	65	F	RE	N	-	A	44.00	42.25	+26.50	6/12	6/12	6/12	6/12	6/12	AC	-	-	-
12	75	F	RE	N	-	A	48.25	45.25	+21.50	6/12	6/18	6/12	6/12	6/12	-	-	-	-
13	68	F	RE	N	-	A	43.00	43.00	+22.50	6/9	6/9	6/9	6/9	6/9	AC	-	-	-
14	60	F	RE	N	-	A	45.50	45.00	+24.50	6/12	6/12	6/12	6/12	6/12	-	-	-	
15	65	F	RE	N	-	C	46.00	45.00	+23.50	4/60	6/12	6/12	6/9	6/9	SK,AC	AU	-	-
16	65	F	LE	N	-	A	46.20	46.20	+25.50	6/9	6/12	6/12	6/12	6/12	SK,AC	--	-	-
17	60	F	RE	N	-	A	44.00	41.50	+23.50	6/12	6/18	6/12	6/12	6/12	-	-	-	-
18	70	F	RE	N	-	A	44.50	45.00	+21.50	6/18	6/18	6/18	6/18	6/18	ID	ID	ID	ID
19	70	M	RE	D	10 years	A	38.20	41.50	+17.50	6/18	6/24	6/18	6/18	6/18	AC	AU	-	-
20	60	F	RE	N	-	C	42.50	43.00	+20.00	6/60	6/12	6/12	6/9	6/9	-	-	-	-
21	70	M	LE	N	-	C	46.50	45.25	+18.00	5/60	6/12	6/12	6/9	6/9	-	-	-	
22	55	M	LE	T	1months	SL	43.50	44.50	+23.50	1/60	4/60	6/60	6/36	6/36	AU,CE,	AU,CE	AU,	AU,
23	68	M	RE	N	-	A	42.50	40.50	+18.50	6/9	6/9	6/9	6/9	6/9	-	-	-	-
24	80	F	LE	D	2years	A	44.50	45.25	+20.50	6/12	6/12	6/12	6/12	6/12	-	-	-	
25	68	M	LE	N	-	A	44.00	44.00	+21.00	6/12	6/24	6/24	6/24	6/24	SK.CE	CE	SD	SD
26	60	F	LE	N	-	A	47.50	45.50	+21.00	6/9	6/12	6/12	6/9	6/9	-	-	-	-
27	79	M	LE	N	-	A	44.00	45.00	+20.00	6/9	6/12	6/12	6/12	6/12	-	-	-	-
28	75	F	RE	N	-	A	45.25	45.75	+26.00	6/12	6/12	6/18	6/12	6/12	AC,IO	IO	-	-
29	70	F	RE	D	1year	A	50.00	47.50	+24.00	6/9	6/12	6/12	6/12	6/12	-	-	-	-
30	55	M	LE	N	-	A	44.75	43.75	+23.50	6/9	6/18	6/12	6/12	6/12	HY,AC		-	-